INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON U.S. PATENT APPLICATION PUBLICATION NO. 2003/0124982 TO SAARI ET AL ("SAARI")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of the asserted claims. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1], particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

U.S. Patent Application Publication No. 2003/0124982 to Saari et al. ("Saari") was filed on October 31, 2002, published on July 3, 2003, and claims priority to October 31, 2001. This patent is prior art under at least 35 U.S.C. § 102(e), and 103(a). As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Saari.

To the extent that Saari is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Saari alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent No. 6,459,413 to Tseng et al. ("Tseng") was filed on January 10, 2001, issued on October 1, 2002, and claims priority to January 10, 2001. This patent is prior art under at least 35 U.S.C. § 102(a) and 103(a).
- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato") was filed on June 12, 2002, published on March 4, 2004, and claims priority to June 12, 2001. This patent is prior art under at least 35 U.S.C. § 102(e) and 103(a).
- International PCT Application Publication No. WO 01/65636 A1 to Hu ("Hu") was filed on February 20, 2001, published on September 7, 2001, and claims priority to March 2, 2000. This publication is prior art under at least 35 U.S.C. § 102(e) and 103(a).
- U.S. Patent Application Publication No. 2003/0222823 to Flint et al ("Flint") was filed on February 20, 2003, published on December 4, 2003, and claims priority to U.S. Patent Application No. 09/866,974 filed on May 29, 2001. This publication is prior art under at least 35 U.S.C. § 102(e) and 103(a).

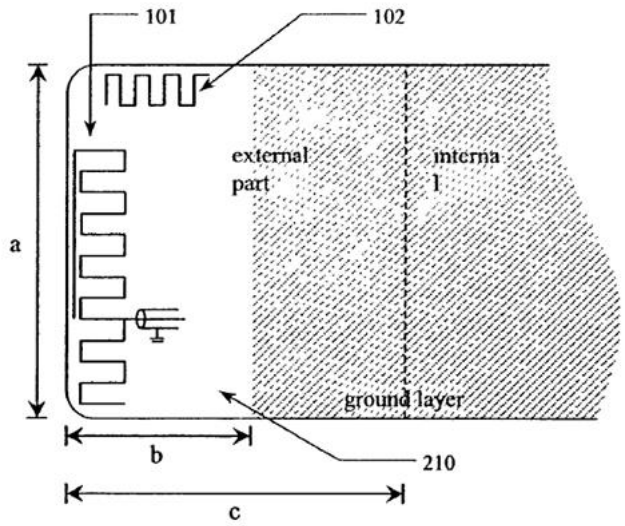
[1] Defendant understands that, by not charting claims 5-6, 10, 12-13, and 16, 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.

Fractus Exhibit 2003
Fractus v. Geotab
Page 1 of 563

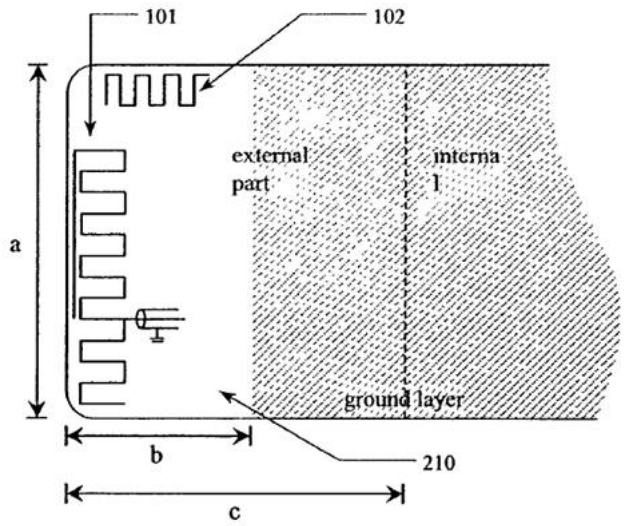
These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants reserve the right to update their constructions and contentions in view of this Court's claim construction order.[2]

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	Claim 1	
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0110]: > The schematic view in FIG. 6b shows the arrangement of the antenna structure used in a PCMCIA/PCCARD especially for mobile devices containing a PCMCIA/PC CARD interface. The design of the PWB 210 supporting the antenna system according to the present invention has also to consider the distance to the device housing to ensure sufficient distance between antennas and conductor to prevent any type of coupling effects. Therefore, the antenna system is placed inside an external plastic housing part of the PCMCIA/PCCARD extending out of the PCMCIA/PC CARD interface insertion. This external plastic housing part has a size at least of 40 mm relating to distance a to 50 mm relating to distance c. The properties of the FR4 substrate material employed for the PWB 210 and the size and height of the antenna system placed on the PWB210 enables to use a low-profile extension housing of the height of only 5 mm. Saari FIG. 6b:

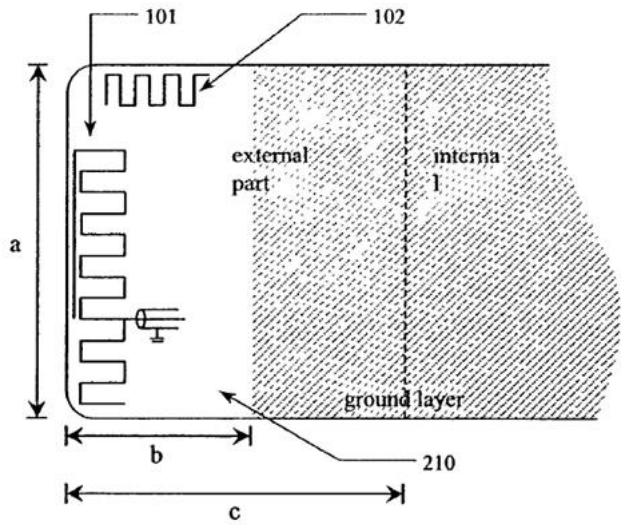
[2] Defendants incorporate herein any related work performed by or on behalf of an author or an inventor in the United States under 35 U.S.C. § 102(g). Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

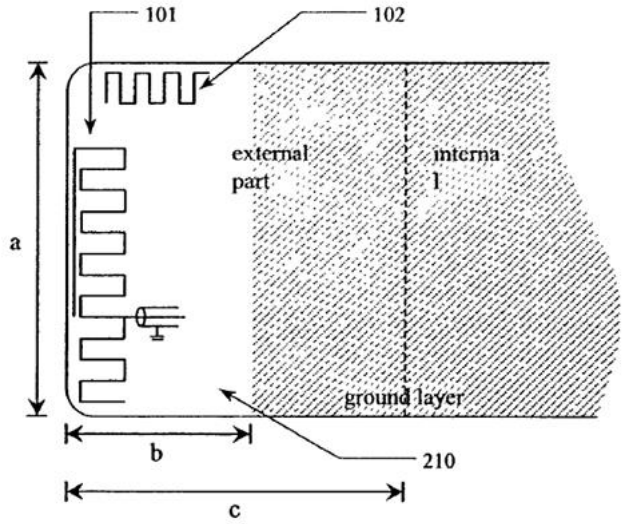
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
1[a]	a ground plane;	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0109]: > As described above, the low resonant frequency of the E-GSM/DCS antenna structure part is determined by the distance of the antenna to the next ground plane of the PWB 210 in order to prevent a coupling to the ground layer. This distance is marked as distance b and should not below 15. Saari FIG. 6b:

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
1[b]	the ground plane is inscribed in a rectangular area comprising a first side and a second side,	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0109]: > As described above, the low resonant frequency of the E-GSM/DCS antenna structure part is determined by the distance of the antenna to the next ground plane of the PWB 210 in order to prevent a coupling to the ground layer. This distance is marked as distance b and should not below 15. Saari FIG. 6b:

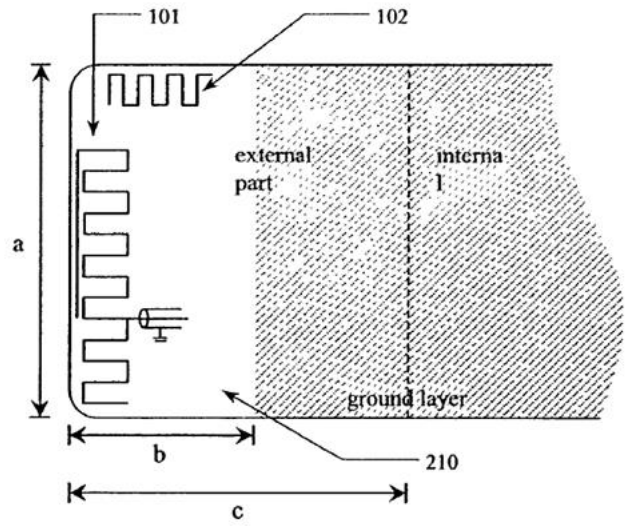
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Claim No.	U.S. Patent No. 8,810,458 B2	Saari
1[c]	a length of the second side being greater than a length of the first side;	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0109]: > As described above, the low resonant frequency of the E-GSM/DCS antenna structure part is determined by the distance of the antenna to the next ground plane of the PWB 210 in order to prevent a coupling to the ground layer. This distance is marked as distance b and should not below 15. Saari FIG. 6b:

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
1[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0106]: FIG. 6a shows one of the antennas of the antenna system of the present invention. The antenna shown is the main antenna used for E-GSM/DCS communication and WLAN/ISM communication. The feedpoint of the antenna is placed substantially in the middle of the antenna structure. The left and right side structure parts relating to the feed point are connected galvanically and parasitically to each other. According to the operation frequency the length of the left antenna structure side is adapted for WLAN operation on the ISM band, i.e., at a resonant frequency of 2.4 GHz. The right side of the antenna structure relating to the feed point of the antenna is prepared for operation on the E-GSM/DCS frequencies, i.e., on the E-GSM/GSM frequencies of 900 MHz and 1.8 GHz and on the DCS frequency of 1.9 GHz. The antenna structure itself consists of a normal meander line including a feedback line. The design of the E-GSM/DCS structure part of the main antenna is carried out according to dual or triple band antennas which are described in several patents such as EP 0 923 158 A2 or EP 0 938 158 A2. Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210

Fractus Exhibit 2003
Fractus v. Geotab
Page 10 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:  Fig. 6b

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[e]	the at least three frequency bands being used for mobile communication services;	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0004]: > Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS).

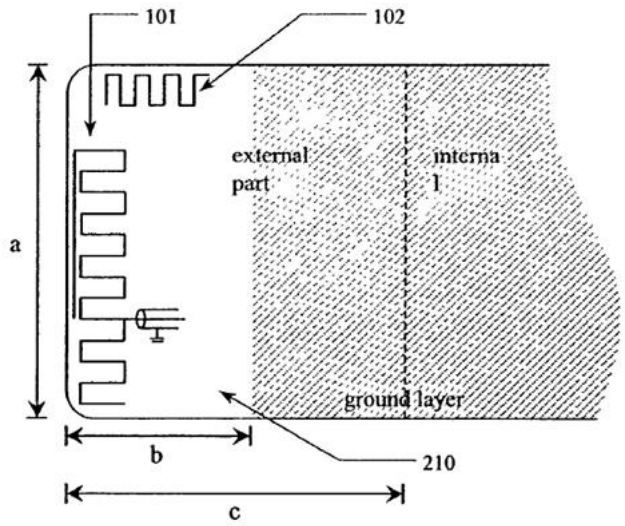
Fractus Exhibit 2003
Fractus v. Geotab
Page 12 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		Saari at [0106]: FIG. 6a shows one of the antennas of the antenna system of the present invention. The antenna shown is the main antenna used for E-GSM/DCS communication and WLAN/ISM communication. The feedpoint of the antenna is placed substantially in the middle of the antenna structure. The left and right side structure parts relating to the feed point are connected galvanically and parasitically to each other. According to the operation frequency the length of the left antenna structure side is adapted for WLAN operation on the ISM band, i.e., at a resonant frequency of 2.4 GHz. The right side of the antenna structure relating to the feed point of the antenna is prepared for operation on the E-GSM/DCS frequencies, i.e., on the E-GSM/GSM frequencies of 900 MHz and 1.8 GHz and on the DCS frequency of 1.9 GHz. The antenna structure itself consists of a normal meander line including a feedback line. The design of the E-GSM/DCS structure part of the main antenna is carried out according to dual or triple band antennas which are described in several patents such as EP 0 923 158 A2 or EP 0 938 158 A2. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[f]	a second antenna configured to receive electromagnetic waves	Saari expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 13 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	corresponding to at least one frequency band;	Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 14 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

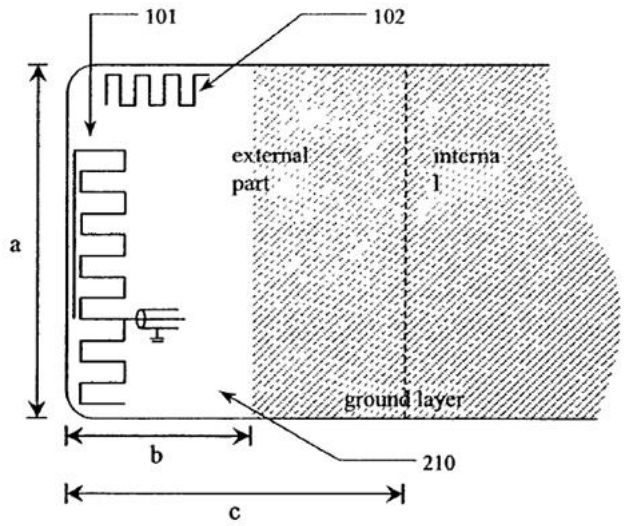
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Fractus Exhibit 2003
Fractus v. Geotab
Page 15 of 563

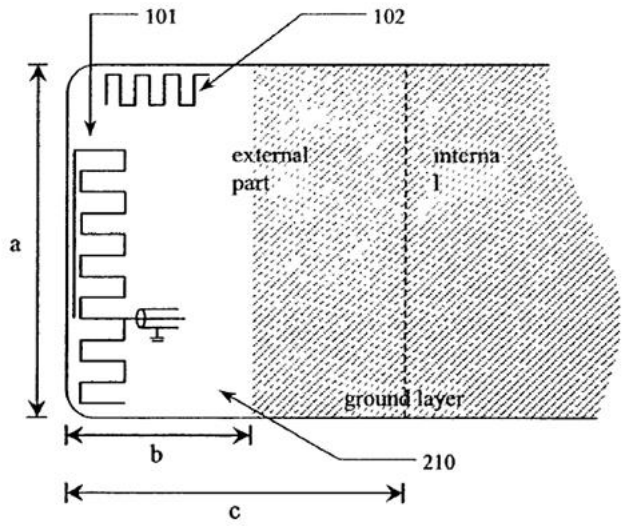
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
1[g]	the at least one frequency band being used for wireless connectivity services;	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0004]: > Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS). Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with

Fractus Exhibit 2003
Fractus v. Geotab
Page 16 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[h]	the first antenna extends in a direction substantially parallel to the first side;	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari FIG. 6b:

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

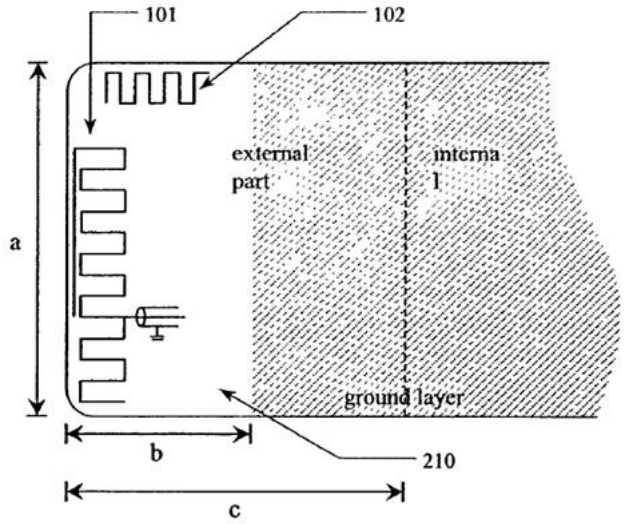
Fractus Exhibit 2003
Fractus v. Geotab
Page 18 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
1[i]	the second antenna extends in a direction substantially parallel to the second side;	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari FIG. 6b:  Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious.

Fractus Exhibit 2003
Fractus v. Geotab
Page 19 of 563

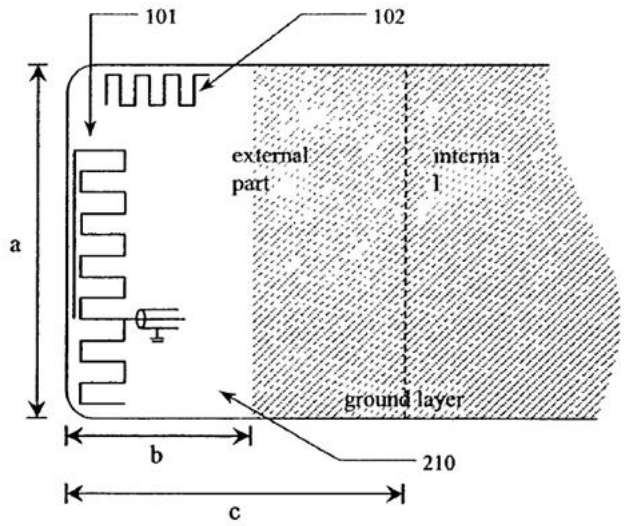
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[j]	the first antenna is arranged substantially close to the first side; and	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 20 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

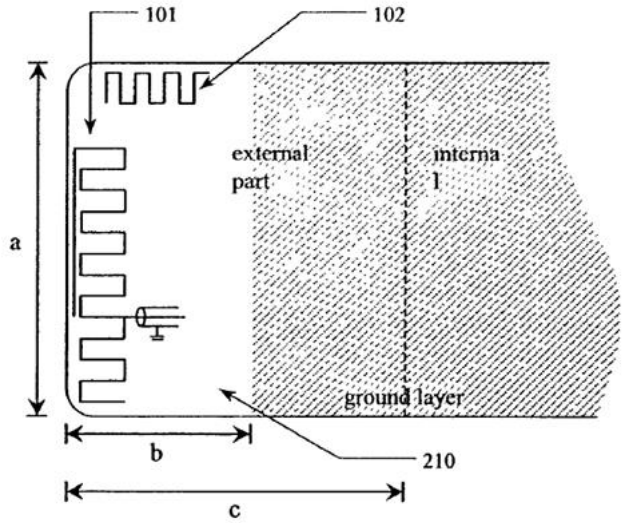
Fractus Exhibit 2003
Fractus v. Geotab
Page 21 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0110]: > The schematic view in FIG. 6b shows the arrangement of the antenna structure used in a PCMCIA/PCCARD especially for mobile devices containing a PCMCIA/PC CARD interface. The design of the PWB 210 supporting the antenna system according to the present invention has also to consider the distance to the device housing to ensure sufficient distance between antennas and conductor to prevent any type of coupling effects. Therefore, the antenna system is placed inside an external plastic housing part of the PCMCIA/PCCARD extending out of the PCMCIA/PC CARD interface insertion. This external plastic housing part has a size at least of 40 mm relating to distance a to 50 mm relating to distance c. The properties of the FR4 substrate material employed for the PWB 210 and the size and height of the antenna system placed on the PWB210 enables to use a low-profile extension housing of the height of only 5 mm. Saari FIG. 6b:

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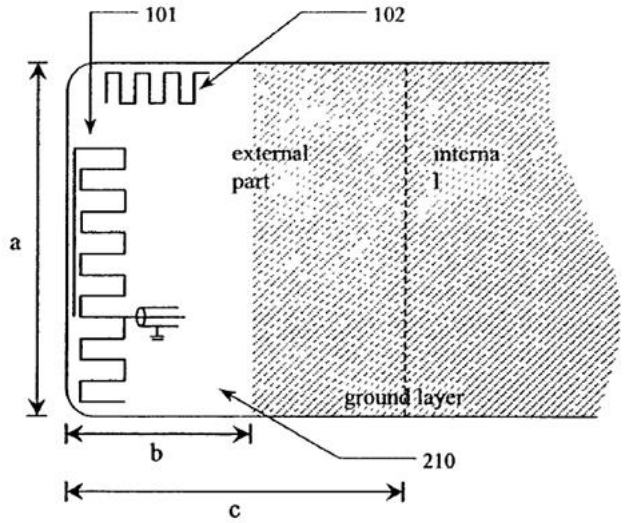
Fractus Exhibit 2003
Fractus v. Geotab
Page 23 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	Claim 2	
2	The wireless handheld or portable device according to claim 1, wherein the second antenna is arranged substantially close to the second side.	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 25 of 563

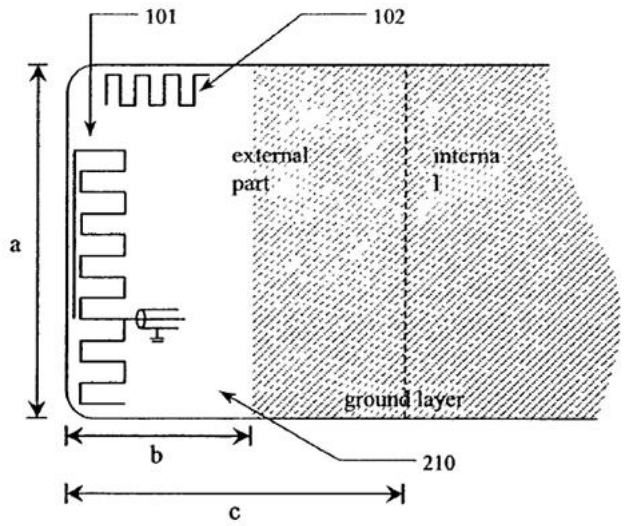
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	Claim 3	
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially close to a corner of the rectangular area.	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

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Fractus Exhibit 2003
Fractus v. Geotab
Page 27 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
Claim 4		
4	The wireless handheld or portable device according to claim 1, wherein the first antenna is arranged substantially close to a corner of the rectangular area.	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 29 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	Claim 7	
7	The wireless handheld or portable device according to claim 1, wherein the at least one frequency band used for wireless connectivity services corresponds to at least one wireless connectivity service selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0004]: > Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS). Saari at [0007]: > WLAN 802.11b mobile communication is a wireless communication standard to cover local areas to supply wireless access to a local area network, e.g., of a company. This standard uses a radio frequency at 2.4 GHz utilising the so-called industrial, scientific and medical (ISM) band. Generally, WLAN communication requires a system of two antennas, so called diversity antenna system to improve above all the receiving performance. The operating wave length of WLAN communication is sufficiently short to accommodate conveniently small geometries available in planar antenna elements. In

Fractus Exhibit 2003
Fractus v. Geotab
Page 30 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		WLAN applications, an indoor environment is typically encountered wherein the propagation of radio waves from one point to another can be greatly affected by the surrounding structures of office areas, and activities taking place within the office area. Due to these effects diversity antennas are used to overcome the problem. Diversity antennas are distinguished by antennas placed in different and favourable positions often orientated in different directions, preferably arranged perpendicularly to each other. Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious.

Fractus Exhibit 2003
Fractus v. Geotab
Page 31 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
Claim 8		
8[pre]	A portable device comprising:	*See* above re claim element 1[pre] which is incorporated by reference herein.
8[a]	a ground plane;	*See* above re claim element 1[a] which is incorporated by reference herein.
8[b]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	*See* above re claim element 1[d] which is incorporated by reference herein.
8[c]	the at least three frequency bands being used for mobile communication services;	*See* above re claim element 1[e] which is incorporated by reference herein.
8[d]	a second antenna configured to operate in at least one frequency band;	*See* above re claim element 1[f] which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 32 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
8[e]	the first antenna extends in a direction substantially parallel to a first side of the portable device;	*See* above re claim element 1[h] which is incorporated by reference herein. *See also, e.g.,*: Saari at [0110]: > The schematic view in FIG. 6b shows the arrangement of the antenna structure used in a PCMCIA/PCCARD especially for mobile devices containing a PCMCIA/PC CARD interface. The design of the PWB 210 supporting the antenna system according to the present invention has also to consider the distance to the device housing to ensure sufficient distance between antennas and conductor to prevent any type of coupling effects. Therefore, the antenna system is placed inside an external plastic housing part of the PCMCIA/PCCARD extending out of the PCMCIA/PC CARD interface insertion. This external plastic housing part has a size at least of 40 mm relating to distance a to 50 mm relating to distance c. The properties of the FR4 substrate material employed for the PWB 210 and the size and height of the antenna system placed on the PWB210 enables to use a low-profile extension housing of the height of only 5 mm. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[f]	a length of a second side of the portable device is greater than	*See* above re claim element 1[c] which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 33 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	a length of the first side of the portable device;	*See also, e.g.*,: Saari at [0110]: > The schematic view in FIG. 6b shows the arrangement of the antenna structure used in a PCMCIA/PCCARD especially for mobile devices containing a PCMCIA/PC CARD interface. The design of the PWB 210 supporting the antenna system according to the present invention has also to consider the distance to the device housing to ensure sufficient distance between antennas and conductor to prevent any type of coupling effects. Therefore, the antenna system is placed inside an external plastic housing part of the PCMCIA/PCCARD extending out of the PCMCIA/PC CARD interface insertion. This external plastic housing part has a size at least of 40 mm relating to distance a to 50 mm relating to distance c. The properties of the FR4 substrate material employed for the PWB 210 and the size and height of the antenna system placed on the PWB210 enables to use a low-profile extension housing of the height of only 5 mm. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	*See* above re claim element 1[j] which is incorporated by reference herein. *See also, e.g.*,:

Fractus Exhibit 2003
Fractus v. Geotab
Page 34 of 563

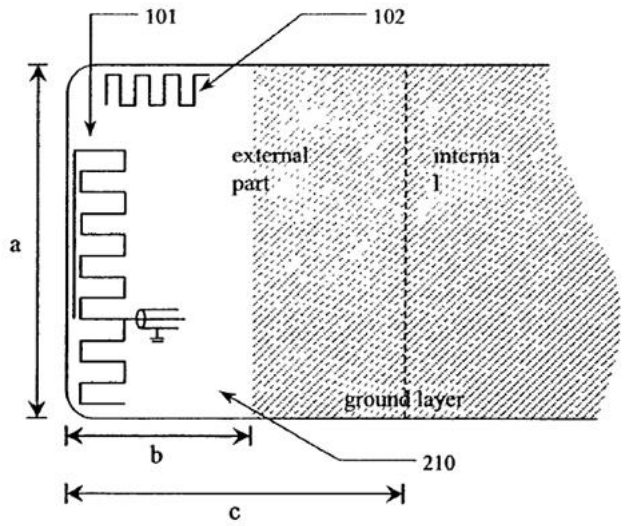
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		Saari at [0110]: > The schematic view in FIG. 6b shows the arrangement of the antenna structure used in a PCMCIA/PCCARD especially for mobile devices containing a PCMCIA/PC CARD interface. The design of the PWB 210 supporting the antenna system according to the present invention has also to consider the distance to the device housing to ensure sufficient distance between antennas and conductor to prevent any type of coupling effects. Therefore, the antenna system is placed inside an external plastic housing part of the PCMCIA/PCCARD extending out of the PCMCIA/PC CARD interface insertion. This external plastic housing part has a size at least of 40 mm relating to distance a to 50 mm relating to distance c. The properties of the FR4 substrate material employed for the PWB 210 and the size and height of the antenna system placed on the PWB210 enables to use a low-profile extension housing of the height of only 5 mm. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	*See* above re claim 3 which is incorporated by reference herein. *See also, e.g.*,: Saari at [0110]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 35 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		The schematic view in FIG. 6b shows the arrangement of the antenna structure used in a PCMCIA/PCCARD especially for mobile devices containing a PCMCIA/PC CARD interface. The design of the PWB 210 supporting the antenna system according to the present invention has also to consider the distance to the device housing to ensure sufficient distance between antennas and conductor to prevent any type of coupling effects. Therefore, the antenna system is placed inside an external plastic housing part of the PCMCIA/PCCARD extending out of the PCMCIA/PC CARD interface insertion. This external plastic housing part has a size at least of 40 mm relating to distance a to 50 mm relating to distance c. The properties of the FR4 substrate material employed for the PWB 210 and the size and height of the antenna system placed on the PWB210 enables to use a low-profile extension housing of the height of only 5 mm. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari at [0110]: The schematic view in FIG. 6b shows the arrangement of the antenna structure used in a PCMCIA/PCCARD especially for mobile devices containing a PCMCIA/PC CARD interface. The design of the PWB 210 supporting the antenna system according to the present invention has also to consider the distance to the device housing to ensure sufficient distance between antennas and conductor to prevent any type of coupling effects. Therefore, the antenna system is placed inside an external plastic housing part of the PCMCIA/PCCARD extending out of the PCMCIA/PC CARD interface insertion. This external plastic housing part has a size at least of 40 mm relating to distance a to 50 mm relating to distance c. The properties of the FR4 substrate material employed for the PWB 210 and the size and height of the antenna system placed on the PWB210 enables to use a low-profile extension housing of the height of only 5 mm. Saari FIG. 6b:

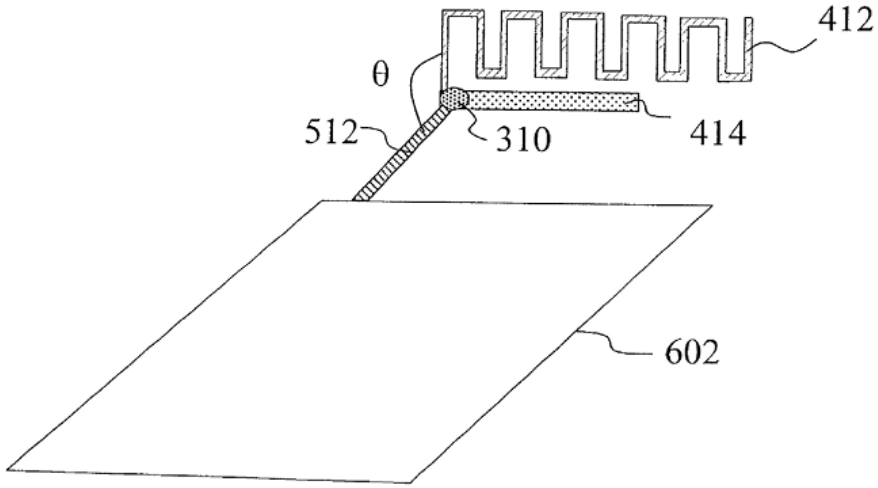
Fractus Exhibit 2003
Fractus v. Geotab
Page 37 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 38 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
8[j]	the first antenna and the second antenna are located internally within the portable device.	*See* above re claim element 1[k] which is incorporated by reference herein.
Claim 9		
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.	It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Tseng at 1:43-56: > Hidden type antennas are mainly designed in accordance with the principle of a planar inverted F-antenna. U.S. Pat. No. 5,926,139 discloses a single planar antenna for use in two frequency bands. As shown in FIG. 2, the planar antenna includes a first radiating portion 202 and a second radiating portion 204. The two radiating portions for the two bands are joined by the connecting portion 208 of a conductive layer 206 and spaced from the ground plane 210 of the conductive layer 206. Each radiating portion is formed as a planar inverted F-antenna on the conductive layer 206. The conductive layer is preferably a metallic layer. A grounding pin 212 interconnects the connecting portion 208 and the ground plane 210 and a single feed pin 214 connects the connecting portion 208 to the input/output port of a transceiver circuitry. Tseng FIG. 6:

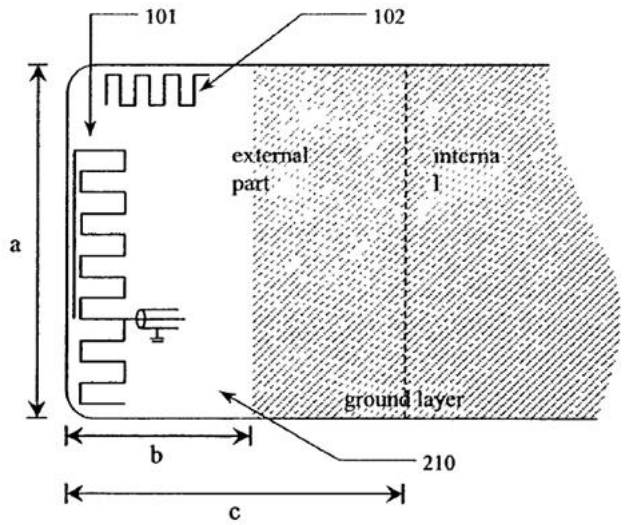
Fractus Exhibit 2003
Fractus v. Geotab
Page 39 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 6
	Claim 11	
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Sato at [0040] – [0041]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 40 of 563

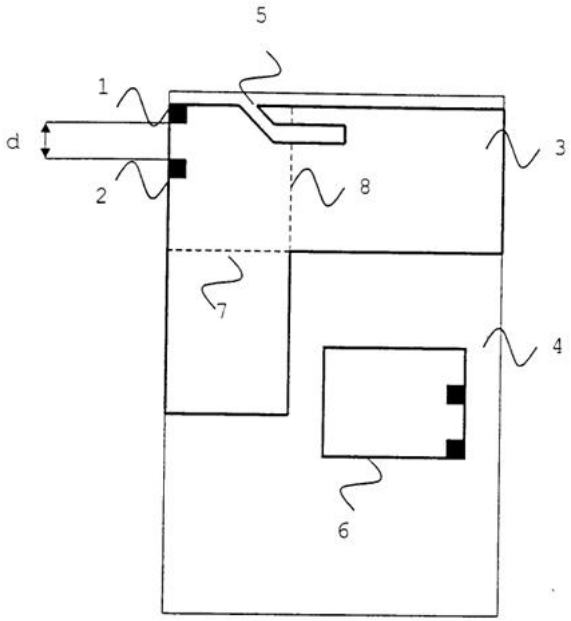
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch.
Claim 14		
14[pre]	A wireless handheld or portable device comprising:	*See* above re claim element 1[pre] which is incorporated by reference herein.
14[a]	a ground plane;	*See* above re claim element 1[a] which is incorporated by reference herein.
14[b]	the ground plane is inscribed in a first rectangular area comprising a first side, a second side and a third side,	*See* above re claim element 1[b] which is incorporated by reference herein. *See also, e.g.*,: Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 41 of 563

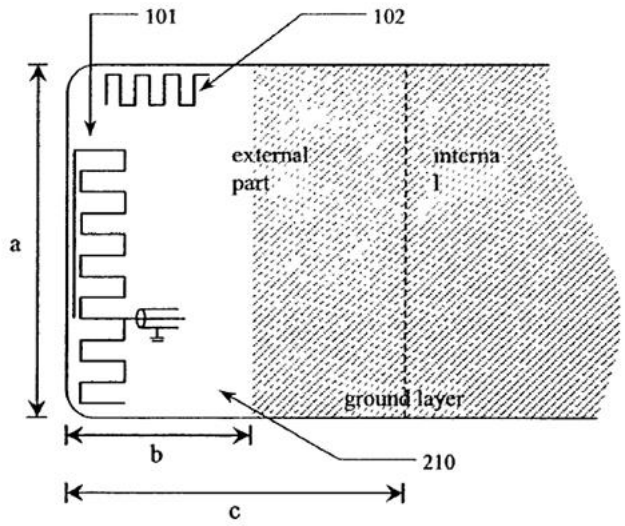
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 42 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		See, e.g., Hu at 6:6-25: In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. The first planar antenna is as described above. The second planar antenna has a resonance frequency with sufficient bandwidth so that it is possible to utilize in Bluetooth applications. The second planer antenna utilizes the same ground element as the first planar antenna. It can utilize the same transceiver unit as the first planar antenna or a separate transceiver unit whichever is preferred. It is due to the unique shape of the first planar antenna that it is possible to provide the second planar antenna for Bluetooth applications and still get a compact antenna. Hu FIG. 2:

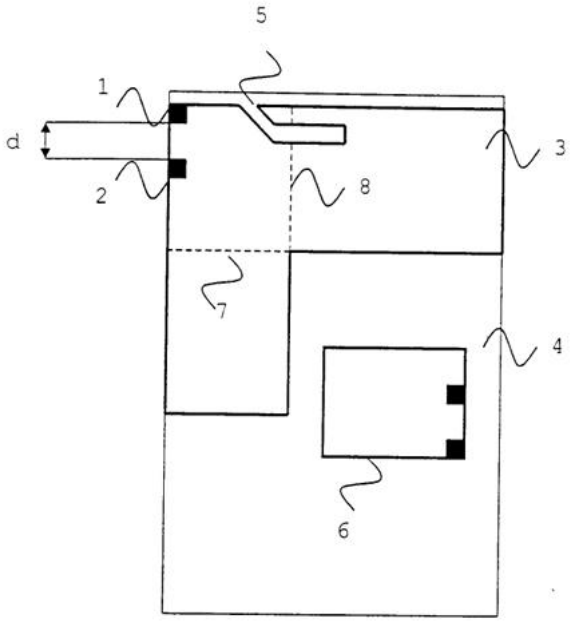
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 2
14[c]	a length of the second side being greater than a length of the first side and a length of the third side;	*See* above re claim element 1[c] which is incorporated by reference herein. *See also, e.g.,*:

Fractus Exhibit 2003
Fractus v. Geotab
Page 44 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		Saari FIG. 6b:  Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 45 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu FIG. 2:

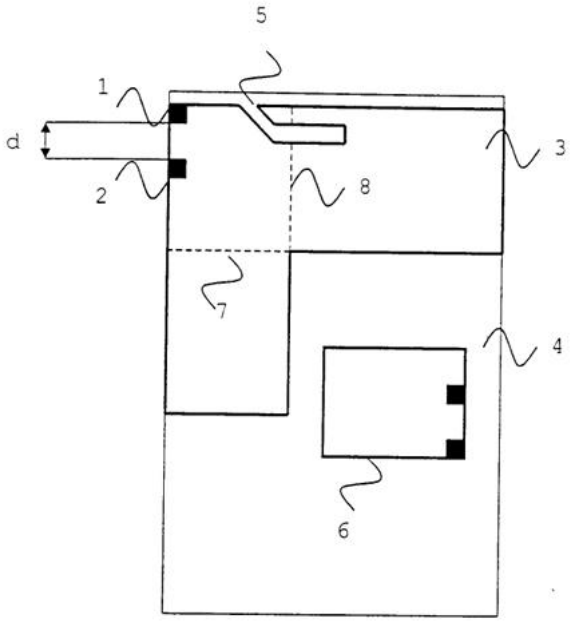
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 2
14[d]	a first antenna configured to transmit and receive electromagnetic waves	*See* above re claim element 1[d] which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 47 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	corresponding to at least two frequency bands;	
14[e]	the at least two frequency bands being used for mobile communication services;	*See* above re claim element 1[e] which is incorporated by reference herein.
14[f]	a second antenna configured to operate in at least one frequency band;	*See* above re claim element 1[f] which is incorporated by reference herein.
14[g]	the at least one frequency band being different from the at least two frequency bands;	*See* above re claim element 1[g] which is incorporated by reference herein.
14[h]	the first antenna extends in a direction substantially parallel to the first side;	*See* above re claim element 1[h] which is incorporated by reference herein.
14[i]	the first antenna is proximate to the first side;	*See* above re claim element 1[j] which is incorporated by reference herein.
14[j]	the second antenna extends in a direction substantially parallel to the third side;	*See* above re claim element 1[i] which is incorporated by reference herein. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

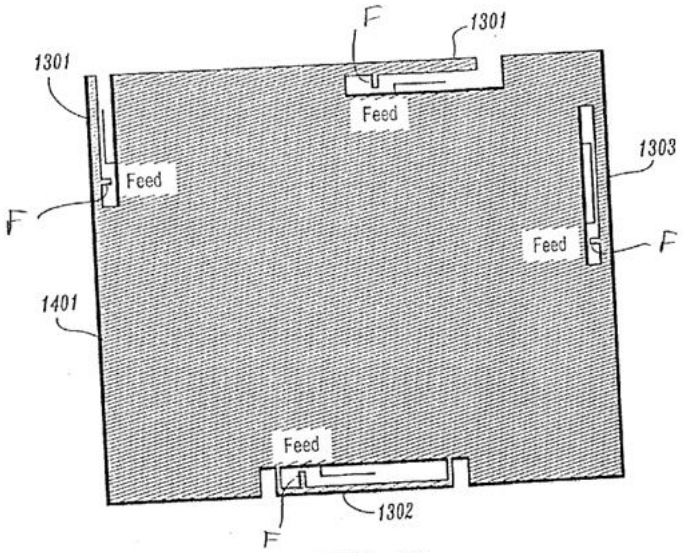
Fractus Exhibit 2003
Fractus v. Geotab
Page 48 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 2 *See also*: Flint at [0056]:

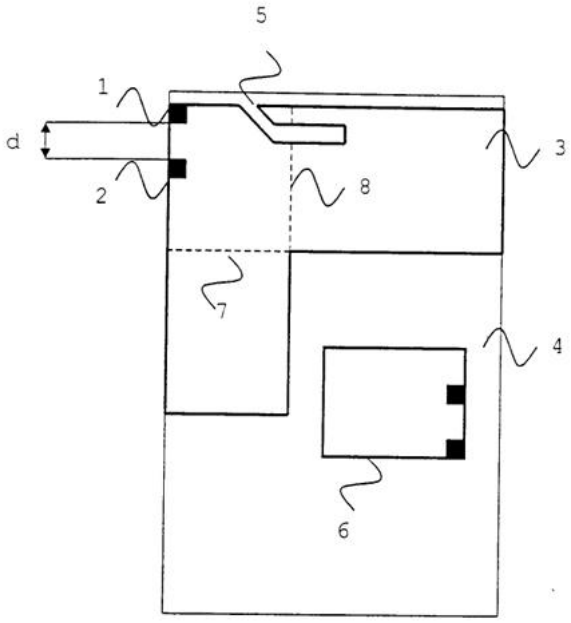
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

Fractus Exhibit 2003
Fractus v. Geotab
Page 51 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 14
14[k]	the second antenna is proximate to the third side;	*See* above re claim 2 which is incorporated by reference herein. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

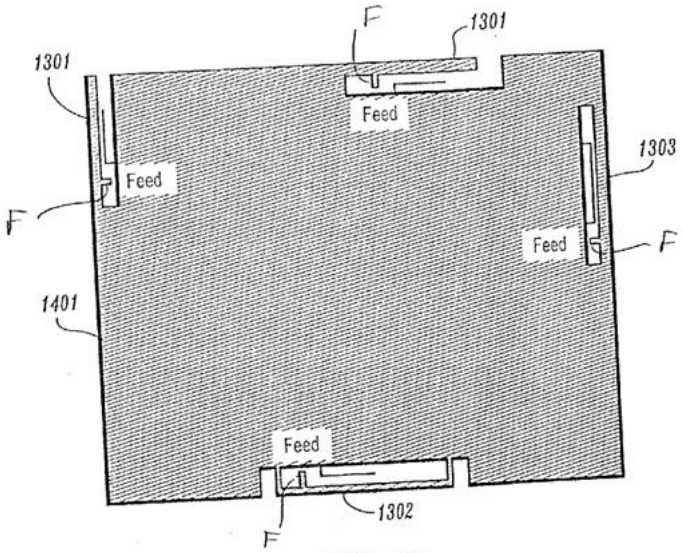
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 53 of 563

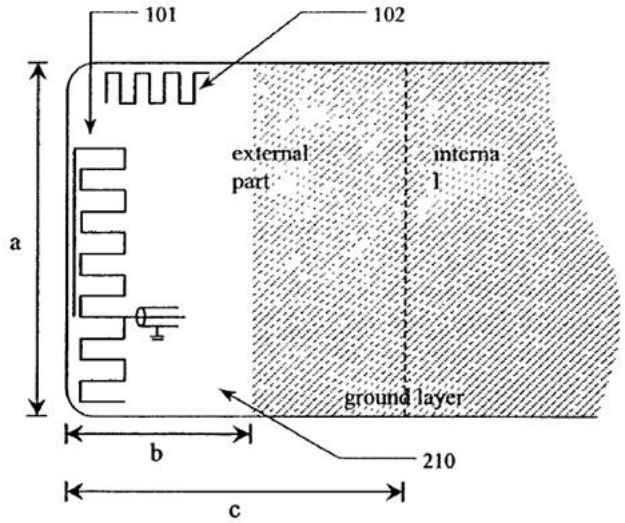
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 2 *See also*: Flint at [0056]:

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

Fractus Exhibit 2003
Fractus v. Geotab
Page 55 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 14
14[l]	the second antenna is inscribed in a second rectangular area;	Saari expressly or inherently discloses this claim element. *See, e.g.*, Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 56 of 563

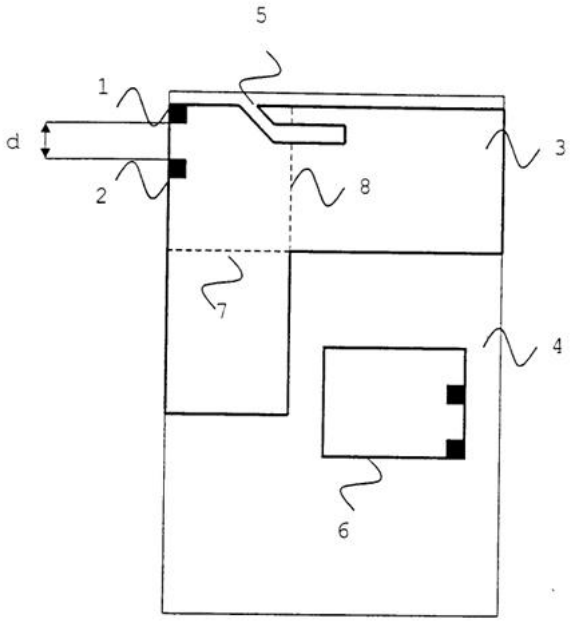
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

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Fractus Exhibit 2003
Fractus v. Geotab
Page 57 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		See, e.g., Hu at 6:6-15: In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

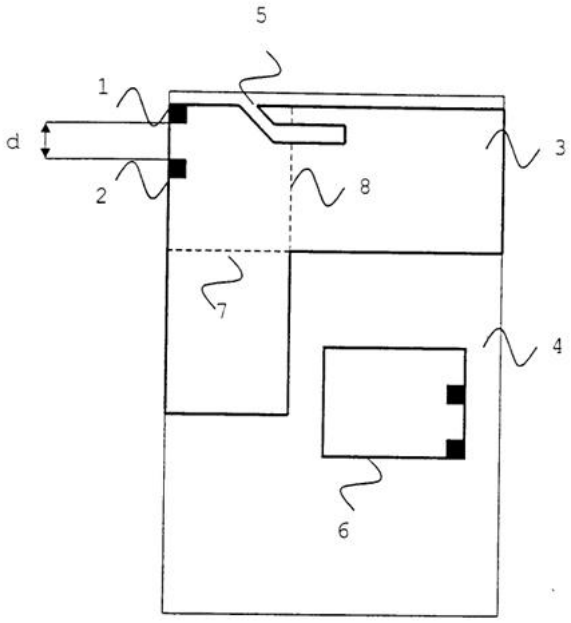
Fractus Exhibit 2003
Fractus v. Geotab
Page 58 of 563

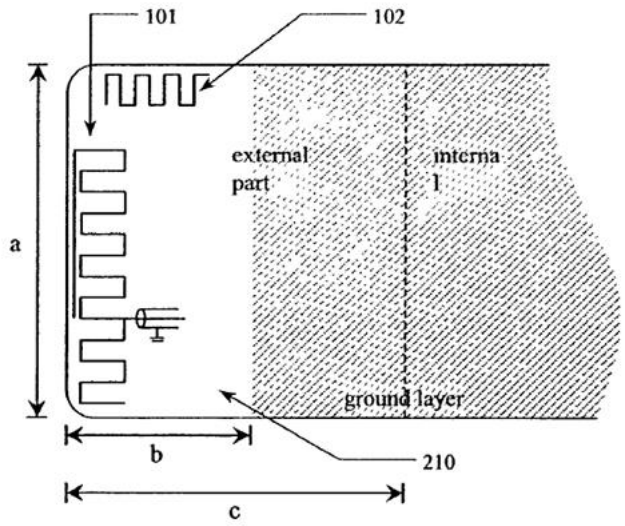
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 2
14[m]	a sum of a length and a width of the second rectangular area is smaller than a quarter of an	Saari expressly or inherently discloses this claim element. *See, e.g.*,

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	operating wavelength of the second antenna;	Saari at [0106] – [0107]: FIG. 6a shows one of the antennas of the antenna system of the present invention. The antenna shown is the main antenna used for E-GSM/DCS communication and WLAN/ISM communication. The feedpoint of the antenna is placed substantially in the middle of the antenna structure. The left and right side structure parts relating to the feed point are connected galvanically and parasitically to each other. According to the operation frequency the length of the left antenna structure side is adapted for WLAN operation on the ISM band, i.e., at a resonant frequency of 2.4 GHz. The right side of the antenna structure relating to the feed point of the antenna is prepared for operation on the E-GSM/DCS frequencies, i.e., on the E-GSM/GSM frequencies of 900 MHz and 1.8 GHz and on the DCS frequency of 1.9 GHz. The antenna structure itself consists of a normal meander line including a feedback line. The design of the E-GSM/DCS structure part of the main antenna is carried out according to dual or triple band antennas which are described in several patents such as EP 0923 158 A2 or EP O 938 158 A2. The lower frequency of the E-GSM/DCS antenna part is determined mainly by the physical length on the distance of the antenna to the nearest grounded structure whereas the higher frequencies is determined mainly by the feedback line. Additional resonant frequencies at high frequencies can be controlled by the employment of parasitic elements. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 60 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu at 6:26-30: > The first frequency band mentioned above is about 824-960 MHz (AMPS and GSM 900), said second frequency band is about 1710-1880 MHz (DCS 1800) or 1880-1990 MHz (PCS 1900), and said third frequency band is about 2400-2500 MHz (Bluetooth). A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 2:

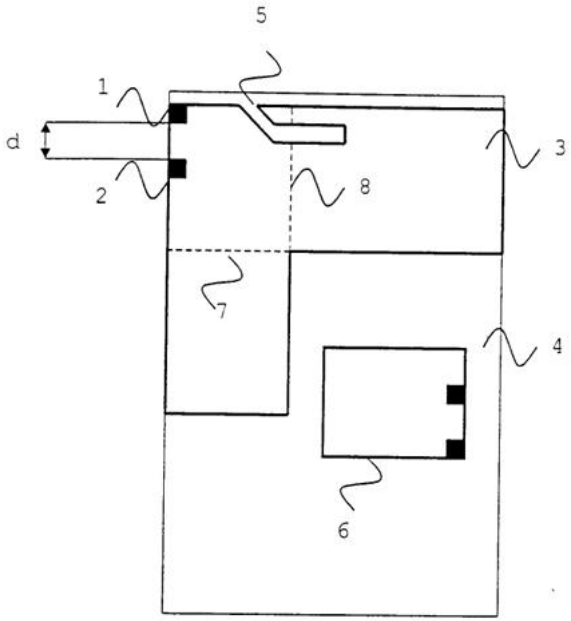
Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 2
14[n]	a geometry of the first antenna being different than a geometry of the second antenna;	Saari expressly or inherently discloses this claim element. *See, e.g.*,

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		Saari FIG. 6b:  Fig. 6b To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 63 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 64 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
		 FIG. 2
14[o]	at least one of the first antenna and the second antenna is proximate to a corner of the first rectangular area; and	*See* above re claims 3, 4 which are incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 65 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
14[p]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	*See* above re claim element 1[k] which is incorporated by reference herein.
Claim 15		
15[pre]	The wireless handheld or portable device according to claim 14,	*See* above re claim 14 which is incorporated by reference herein.
15[a]	wherein the first antenna is proximate to a first corner of the first rectangular area and	*See* above re claim 4 which is incorporated by reference herein.
15[b]	the second antenna is proximate to a second corner of the first rectangular area.	*See* above re claim 3 which is incorporated by reference herein.
Claim 17		
17	The wireless handheld or portable device according to claim 14, wherein the at least one frequency band is used for a wireless connectivity service selected from the group comprising: Bluetooth™,	*See* above re claim 7 which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 66 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Saari
	IEEE802.11a, IEEE802.11b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON U.S. PATENT NO. 6,388,626 TO GAMALIELSSON ET AL ("GAMALIELSSON")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of the asserted claims. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1], particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

U.S. Patent No. 6,388,626 to Gamalielsson et al. ("Gamalielsson") was filed on May 14, 1998, issued on May 14, 2002, and claims priority to July 9, 1997. This patent is prior art under at least 35 U.S.C. § 102(a), and 103(a). As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Gamalielsson.

To the extent that Gamalielsson is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Gamalielsson alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Application Publication No. 2003/0124982 to Saari et al. ("Saari") was filed on October 31, 2002, published on July 3, 2003, and claims priority to October 31, 2001. This patent is prior art under at least 35 U.S.C. § 102(e), and 103(a).
- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato") was filed on June 12, 2002, published on March 4, 2004, and claims priority to June 12, 2001. This patent is prior art under at least 35 U.S.C. § 102(e) and 103(a).
- International PCT Application Publication No. WO 01/65636 A1 to Hu ("Hu") was filed on February 20, 2001, published on September 7, 2001, and claims priority to March 2, 2000. This publication is prior art under at least 35 U.S.C. § 102(e) and 103(a).
- U.S. Patent Application Publication No. 2003/0222823 to Flint et al ("Flint") was filed on February 20, 2003, published on December 4, 2003, and claims priority to U.S. Patent Application No. 09/866,974 filed on May 29, 2001. This publication is prior art under at least 35 U.S.C. § 102(e) and 103(a).

[1] Defendant understands that, by not charting claims 5-6, 10, 12-13, and 16, 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.

Fractus Exhibit 2003
Fractus v. Geotab
Page 68 of 563

These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants reserve the right to update their constructions and contentions in view of this Court's claim construction order.[2]

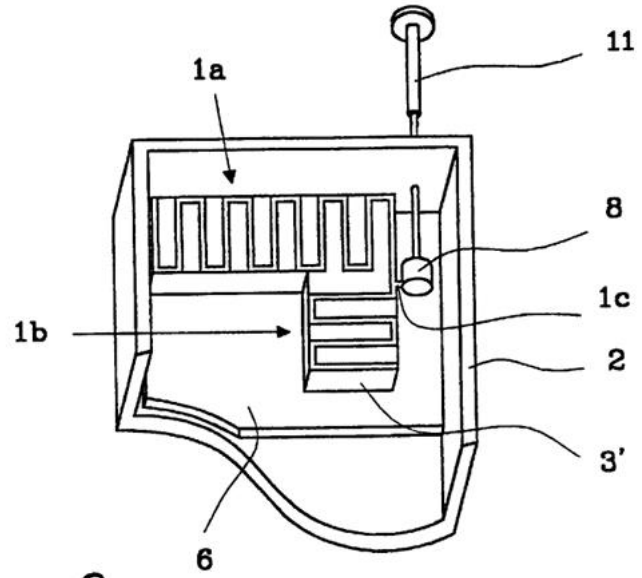
Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
	Claim 1	
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 1:5-11: > The present invention relates to an antenna device for a hand- portable radio communication unit, in particular a mobile telephone, including a casing, in which a ground plane means having at least one edge is disposed. The antenna device comprises first and second radiating elements carried by support means, and said first and second radiating elements being tuned to different resonant frequencies. Gamalielsson at 3:21-30: > With reference to FIGS. 1, 4 and 11, there is shown a first, basic embodiment of the antenna device according to the invention, the antenna device 1 being disposed in one end portion of an elongated, box-like casing 2 of a hand-portable mobile telephone. All parts of the telephone as such, including its electronic circuitry, are left out from FIG. 1, even the rear wall of the casing. Of course, the casing 2 is normally designed with smooth

[2] Defendants incorporate herein any related work performed by or on behalf of an author or an inventor in the United States under 35 U.S.C. § 102(g). Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

Fractus Exhibit 2003
Fractus v. Geotab
Page 69 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		corners and a general shape making the telephone unit visually pleasant and convenient to hold in one hand by the user. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[a]	a ground plane;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 11:1-5: In the embodiments with helical elements 21a, 21b shown in figs. 8-10, a thin, dielectric sleeve is preferably disposed around each helical coil so as to provide an improved mechanical stability. Matching circuitry may be arranged on the printed circuit card carrying the ground plane means 6. Gamalielsson FIG. 6:

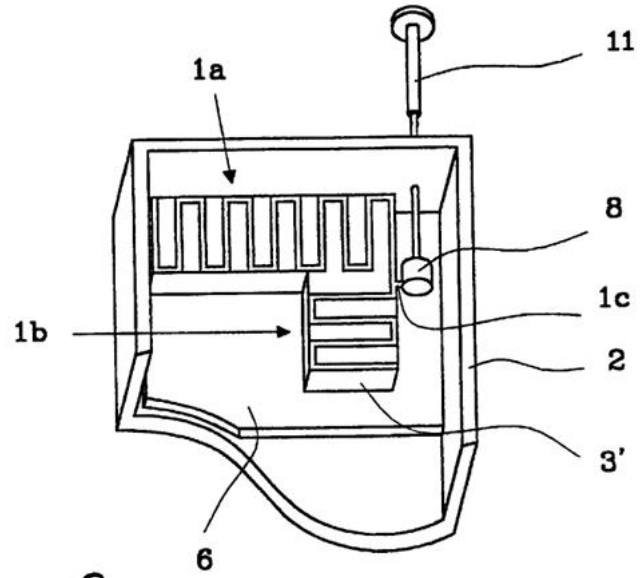
Fractus Exhibit 2003
Fractus v. Geotab
Page 70 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

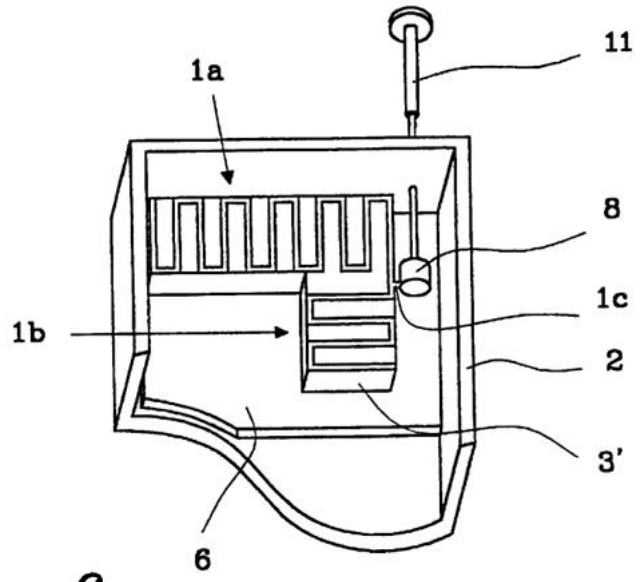
Fractus Exhibit 2003
Fractus v. Geotab
Page 71 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
1[b]	the ground plane is inscribed in a rectangular area comprising a first side and a second side,	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 11:1-5: > In the embodiments with helical elements 21a, 21b shown in figs. 8-10, a thin, dielectric sleeve is preferably disposed around each helical coil so as to provide an improved mechanical stability. Matching circuitry may be arranged on the printed circuit card carrying the ground plane means 6. Gamalielsson FIG. 6:

Fractus Exhibit 2003
Fractus v. Geotab
Page 72 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

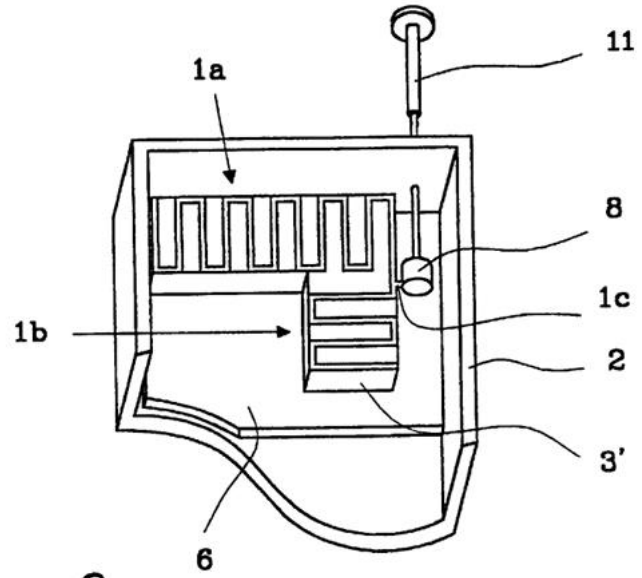
Fractus Exhibit 2003
Fractus v. Geotab
Page 73 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
1[c]	a length of the second side being greater than a length of the first side;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson FIG. 6:  Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious.

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 3:41-52: > The antenna elements 1a and 1b are constituted by flat meander-configured elements of an electrically conductive material, normally a metal material such as aluminium or copper. Although the meander element is shaped as a continuous meander element, there are two radiating elements 1a and 1b extending from a common feed point 1c in opposite directions to a respective free end 1aa, 1bb (FIG. 11). The two radiating elements 1a, 1b are tuned to different resonant frequencies allowing operation of the antenna device in two overlapping or separated frequency bands, for example 900 MHz and 1.8 GHz. The common feed point 1c is to be connected to a feeding circuitry of the telephone. Gamalielsson FIG. 6:

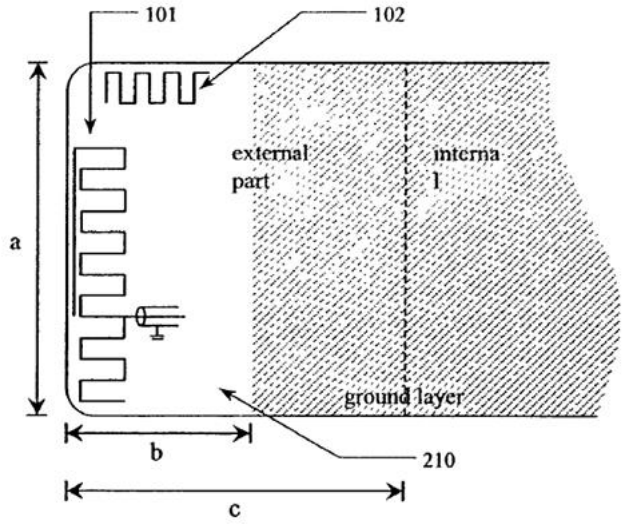
Fractus Exhibit 2003
Fractus v. Geotab
Page 75 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 76 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		See, e.g., Saari at [0106]: FIG. 6a shows one of the antennas of the antenna system of the present invention. The antenna shown is the main antenna used for E-GSM/DCS communication and WLAN/ISM communication. The feedpoint of the antenna is placed substantially in the middle of the antenna structure. The left and right side structure parts relating to the feed point are connected galvanically and parasitically to each other. According to the operation frequency the length of the left antenna structure side is adapted for WLAN operation on the ISM band, i.e., at a resonant frequency of 2.4 GHz. The right side of the antenna structure relating to the feed point of the antenna is prepared for operation on the E-GSM/DCS frequencies, i.e., on the E-GSM/GSM frequencies of 900 MHz and 1.8 GHz and on the DCS frequency of 1.9 GHz. The antenna structure itself consists of a normal meander line including a feedback line. The design of the E-GSM/DCS structure part of the main antenna is carried out according to dual or triple band antennas which are described in several patents such as EP 0 923 158 A2 or EP 0 938 158 A2. Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used

Fractus Exhibit 2003
Fractus v. Geotab
Page 77 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:  Fig. 6b

Fractus Exhibit 2003
Fractus v. Geotab
Page 78 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
1[e]	the at least three frequency bands being used for mobile communication services;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 3:41-52: > The antenna elements 1a and 1b are constituted by flat meander-configured elements of an electrically conductive material, normally a metal material such as aluminium or copper. Although the meander element is shaped as a continuous meander element, there are two radiating elements 1a and 1b extending from a common feed point 1c in opposite directions to a respective free end 1aa, 1bb (FIG. 11). The two radiating elements 1a, 1b are tuned to different resonant frequencies allowing operation of the antenna device in two overlapping or separated frequency bands, for example 900 MHz and 1.8 GHz. The common feed point 1c is to be connected to a feeding circuitry of the telephone. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0004]:

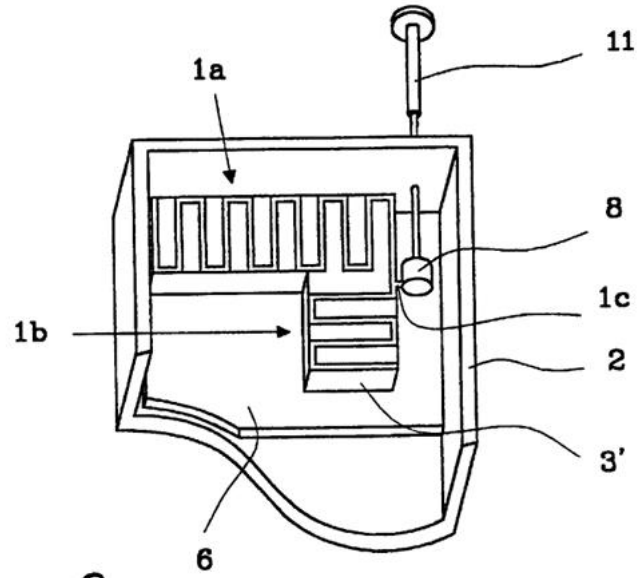
Fractus Exhibit 2003
Fractus v. Geotab
Page 79 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS). Saari at [0106]: FIG. 6a shows one of the antennas of the antenna system of the present invention. The antenna shown is the main antenna used for E-GSM/DCS communication and WLAN/ISM communication. The feedpoint of the antenna is placed substantially in the middle of the antenna structure. The left and right side structure parts relating to the feed point are connected galvanically and parasitically to each other. According to the operation frequency the length of the left antenna structure side is adapted for WLAN operation on the ISM band, i.e., at a resonant frequency of 2.4 GHz. The right side of the antenna structure relating to the feed point of the antenna is prepared for operation on the E-GSM/DCS frequencies, i.e., on the E-GSM/GSM frequencies of 900 MHz and 1.8 GHz and on the DCS frequency of 1.9 GHz. The antenna structure itself consists of a normal meander line including a feedback line. The design of the E-GSM/DCS structure part of the main antenna is carried out according to dual or triple band antennas which are described in several patents such as EP 0 923 158 A2 or EP 0 938 158 A2.

Fractus Exhibit 2003
Fractus v. Geotab
Page 80 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
1[f]	a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 3:41-52: > The antenna elements 1a and 1b are constituted by flat meander-configured elements of an electrically conductive material, normally a metal material such as aluminium or copper. Although the meander element is shaped as a continuous meander element, there are two radiating elements 1a and 1b extending from a common feed point 1c in opposite directions to a respective free end 1aa, 1bb (FIG. 11). The two radiating elements 1a, 1b are tuned to different resonant frequencies allowing operation of the antenna device in two overlapping or separated frequency bands, for example 900 MHz and 1.8 GHz. The common feed point 1c is to be connected to a feeding circuitry of the telephone. Gamalielsson FIG. 6:

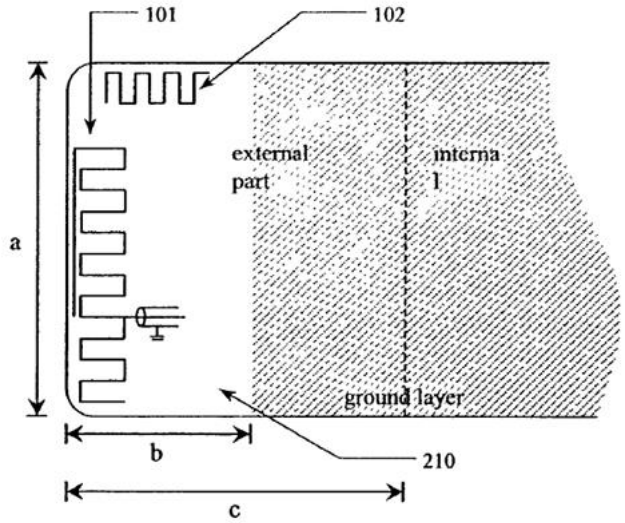
Fractus Exhibit 2003
Fractus v. Geotab
Page 81 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 82 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		See, e.g., Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 83 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6b
1[g]	the at least one frequency band being used for wireless connectivity services;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 3:41-52: The antenna elements 1a and 1b are constituted by flat meander-configured elements of an electrically conductive material, normally a metal material such as aluminium or copper. Although the meander element is shaped as a continuous meander element, there are two radiating elements 1a and 1b extending from a common feed point 1c in opposite

Fractus Exhibit 2003
Fractus v. Geotab
Page 84 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		directions to a respective free end 1aa, 1bb (FIG. 11). The two radiating elements 1a, 1b are tuned to different resonant frequencies allowing operation of the antenna device in two overlapping or separated frequency bands, for example 900 MHz and 1.8 GHz. The common feed point 1c is to be connected to a feeding circuitry of the telephone. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0004]: Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile

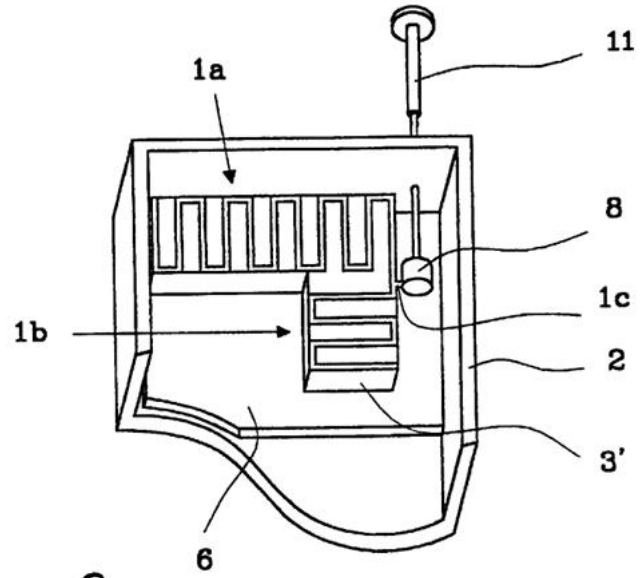
Fractus Exhibit 2003
Fractus v. Geotab
Page 85 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS). Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving.
1[h]	the first antenna extends in a direction substantially parallel to the first side;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 4:33-48: In a second embodiment of the antenna device, as shown in FIG. 6, the meander-configured radiating elements 1a and 1b are mounted on a L-shaped support body 3', the first meander radiating element 1a being oriented with its longitudinal axis along one

Fractus Exhibit 2003
Fractus v. Geotab
Page 86 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		edge (the shorter edge) of the rectangular ground plane means 6, and the other meander radiating element 1b being oriented with its longitudinal axis adjacent and in parallel to the adjacent, longer edge of the ground plane means 6. In this case, the common feed point 1c is located relatively close to the upper corner of the elongated box-like casing 2. So, an extendable antenna rod 11 can be conveniently located in this corner region, as is also apparent from FIG. 6. Although not shown specifically, the antenna rod 11 can be retracted fully into the casing upon being slid through the sleeve 8 at the common feed point 1c. Gamalielsson FIG. 6:

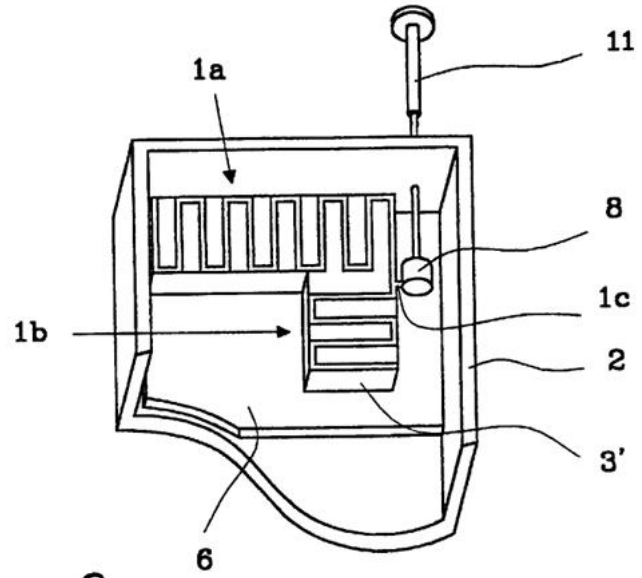
Fractus Exhibit 2003
Fractus v. Geotab
Page 87 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 88 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
1[i]	the second antenna extends in a direction substantially parallel to the second side;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 4:33-48: > In a second embodiment of the antenna device, as shown in FIG. 6, the meander-configured radiating elements 1a and 1b are mounted on a L-shaped support body 3', the first meander radiating element 1a being oriented with its longitudinal axis along one edge (the shorter edge) of the rectangular ground plane means 6, and the other meander radiating element 1b being oriented with its longitudinal axis adjacent and in parallel to the adjacent, longer edge of the ground plane means 6. > In this case, the common feed point 1c is located relatively close to the upper corner of the elongated box-like casing 2. So, an extendable antenna rod 11 can be conveniently located in this corner region, as is also apparent from FIG. 6. Although not shown specifically, the antenna rod 11 can be retracted fully into the casing upon being slid through the sleeve 8 at the common feed point 1c. Gamalielsson FIG. 6:

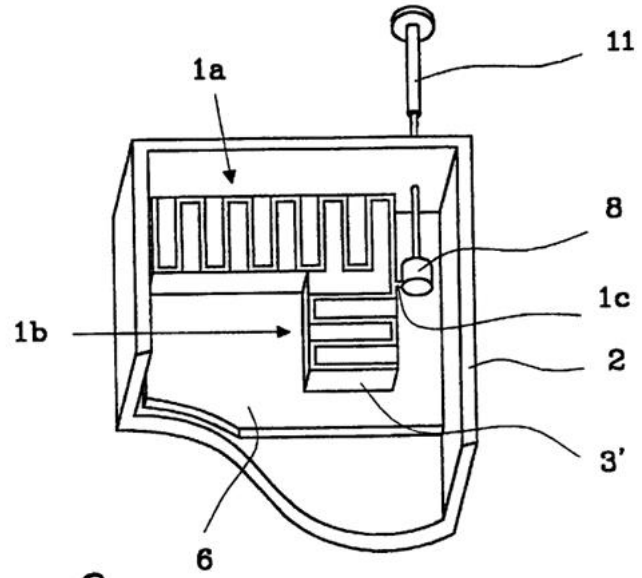
Fractus Exhibit 2003
Fractus v. Geotab
Page 89 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 90 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
1[j]	the first antenna is arranged substantially close to the first side; and	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 4:33-48: > In a second embodiment of the antenna device, as shown in FIG. 6, the meander-configured radiating elements 1a and 1b are mounted on a L-shaped support body 3', the first meander radiating element 1a being oriented with its longitudinal axis along one edge (the shorter edge) of the rectangular ground plane means 6, and the other meander radiating element 1b being oriented with its longitudinal axis adjacent and in parallel to the adjacent, longer edge of the ground plane means 6. > In this case, the common feed point 1c is located relatively close to the upper corner of the elongated box-like casing 2. So, an extendable antenna rod 11 can be conveniently located in this corner region, as is also apparent from FIG. 6. Although not shown specifically, the antenna rod 11 can be retracted fully into the casing upon being slid through the sleeve 8 at the common feed point 1c. Gamalielsson FIG. 6:

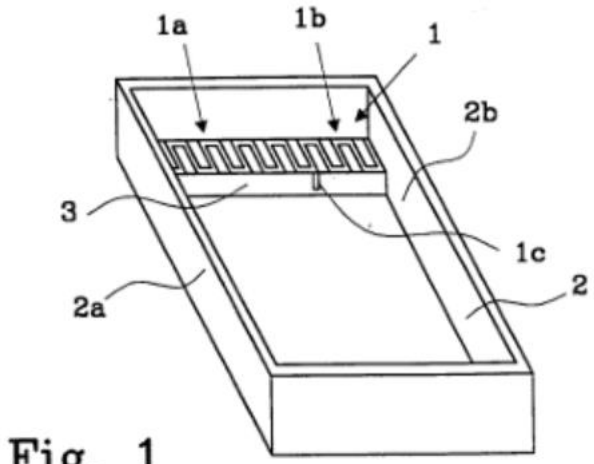
Fractus Exhibit 2003
Fractus v. Geotab
Page 91 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

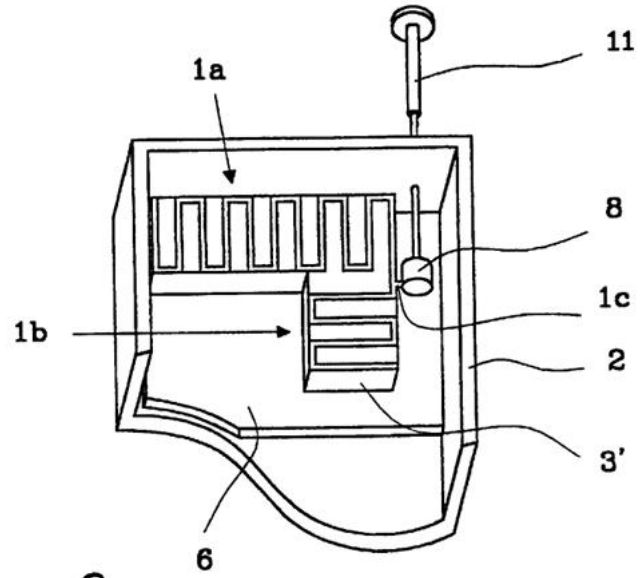
Fractus Exhibit 2003
Fractus v. Geotab
Page 92 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 1:41-55: > According to a first aspect of the invention the main object stated above is achieved for an antenna device having the features stated as first and second radiating elements carried by a support means. Thus, the first and second radiating elements, each being tuned to a specific resonant frequency, are disposed in a compact arrangement on a support means, which is adapted to be mounted with the first and second radiating elements located in proximity of, i.e. adjacent to, one or two edges of the ground plane means so as to be confined entirely in the casing. The two radiating elements preferably extends with their longitudinal axes substantially in parallel to Said one or two edges. Gamalielsson at 4:17-20: > Fig. 1 shows, schematically, in a perspective view from the rear, a telephone casing with an interior antenna device according to the invention, the rear wall of the telephone casing being taken away for clarity; Gamalielsson FIG. 1:

Fractus Exhibit 2003
Fractus v. Geotab
Page 93 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 1 Gamalielsson FIG. 6:

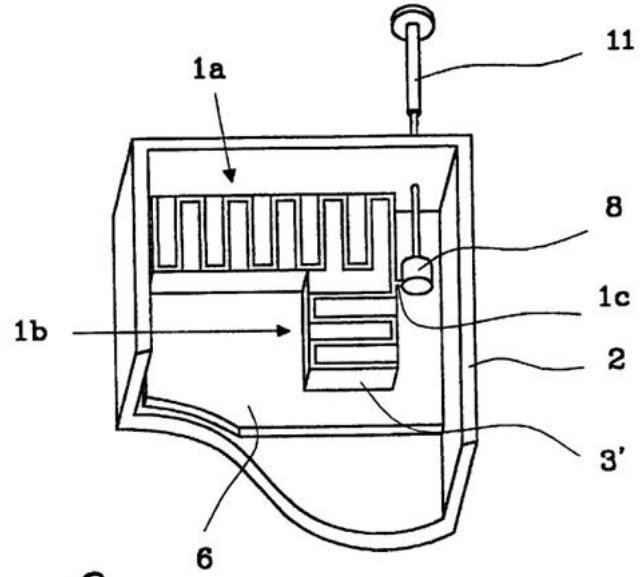
Fractus Exhibit 2003
Fractus v. Geotab
Page 94 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

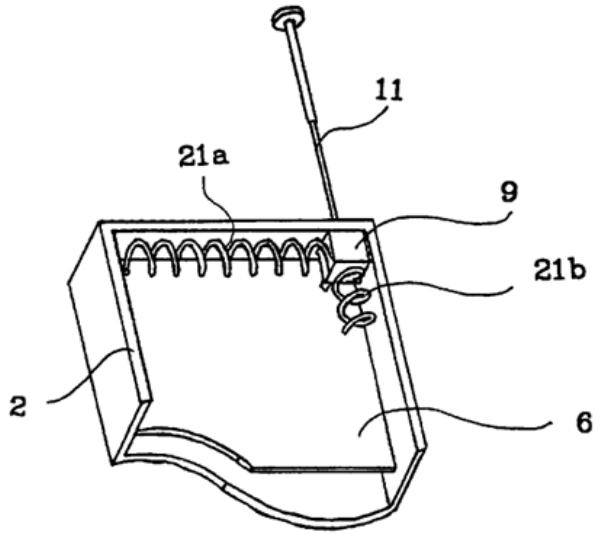
Fractus Exhibit 2003
Fractus v. Geotab
Page 95 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
Claim 2		
2	The wireless handheld or portable device according to claim 1, wherein the second antenna is arranged substantially close to the second side.	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 4:33-48: > In a second embodiment of the antenna device, as shown in FIG. 6, the meander-configured radiating elements 1a and 1b are mounted on a L-shaped support body 3', the first meander radiating element 1a being oriented with its longitudinal axis along one edge (the shorter edge) of the rectangular ground plane means 6, and the other meander radiating element 1b being oriented with its longitudinal axis adjacent and in parallel to the adjacent, longer edge of the ground plane means 6. > In this case, the common feed point 1c is located relatively close to the upper corner of the elongated box-like casing 2. So, an extendable antenna rod 11 can be conveniently located in this corner region, as is also apparent from FIG. 6. Although not shown specifically, the antenna rod 11 can be retracted fully into the casing upon being slid through the sleeve 8 at the common feed point 1c. Gamalielsson FIG. 6:

Fractus Exhibit 2003
Fractus v. Geotab
Page 96 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 Gamalielsson FIG. 10:

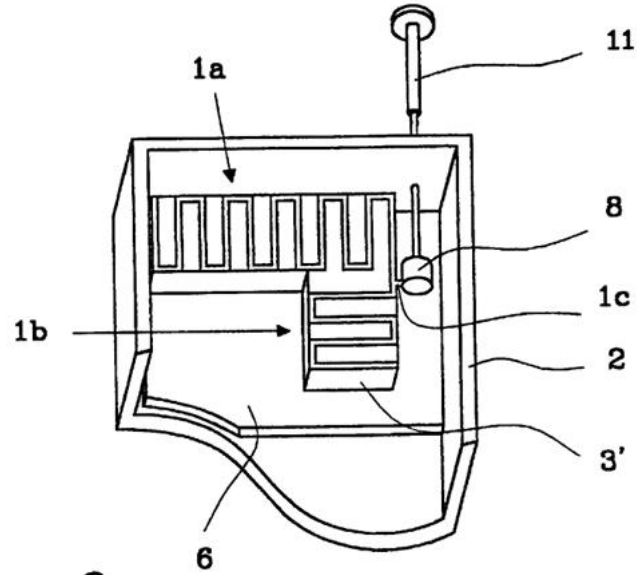
Fractus Exhibit 2003
Fractus v. Geotab
Page 97 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 10 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

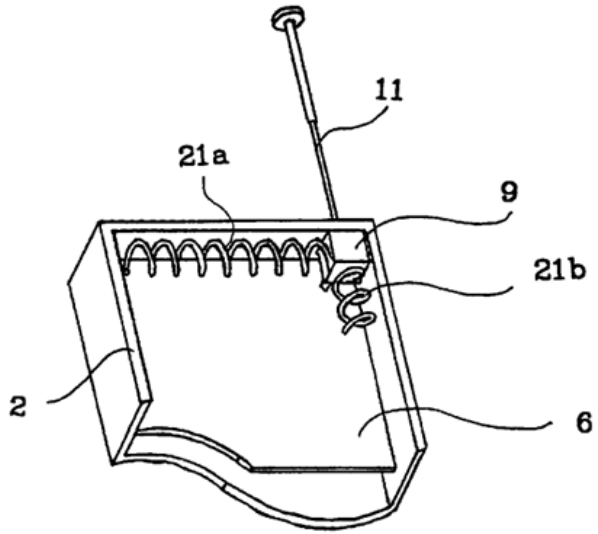
Fractus Exhibit 2003
Fractus v. Geotab
Page 98 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
Claim 3		
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially close to a corner of the rectangular area.	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 4:33-48: > In a second embodiment of the antenna device, as shown in FIG. 6, the meander-configured radiating elements 1a and 1b are mounted on a L-shaped support body 3', the first meander radiating element 1a being oriented with its longitudinal axis along one edge (the shorter edge) of the rectangular ground plane means 6, and the other meander radiating element 1b being oriented with its longitudinal axis adjacent and in parallel to the adjacent, longer edge of the ground plane means 6. > In this case, the common feed point 1c is located relatively close to the upper corner of the elongated box-like casing 2. So, an extendable antenna rod 11 can be conveniently located in this corner region, as is also apparent from FIG. 6. Although not shown specifically, the antenna rod 11 can be retracted fully into the casing upon being slid through the sleeve 8 at the common feed point 1c. Gamalielsson FIG. 6:

Fractus Exhibit 2003
Fractus v. Geotab
Page 99 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 Gamalielsson FIG. 10:

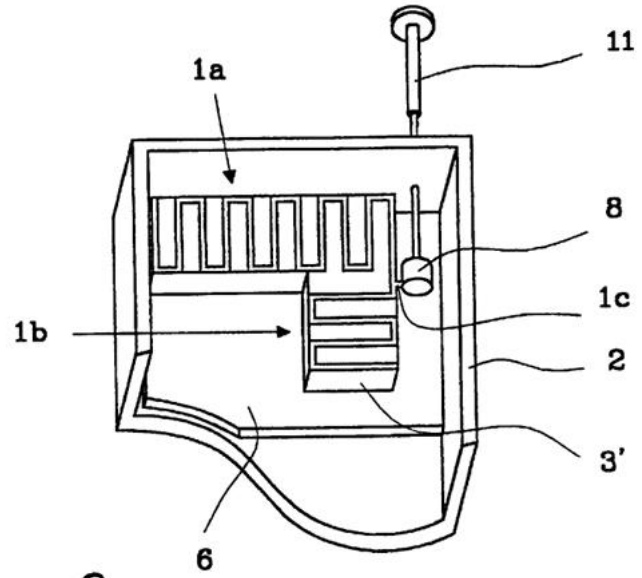
Fractus Exhibit 2003
Fractus v. Geotab
Page 100 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 10 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 101 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
Claim 4		
4	The wireless handheld or portable device according to claim 1, wherein the first antenna is arranged substantially close to a corner of the rectangular area.	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 4:33-48: > In a second embodiment of the antenna device, as shown in FIG. 6, the meander-configured radiating elements 1a and 1b are mounted on a L-shaped support body 3', the first meander radiating element 1a being oriented with its longitudinal axis along one edge (the shorter edge) of the rectangular ground plane means 6, and the other meander radiating element 1b being oriented with its longitudinal axis adjacent and in parallel to the adjacent, longer edge of the ground plane means 6. > In this case, the common feed point 1c is located relatively close to the upper corner of the elongated box-like casing 2. So, an extendable antenna rod 11 can be conveniently located in this corner region, as is also apparent from FIG. 6. Although not shown specifically, the antenna rod 11 can be retracted fully into the casing upon being slid through the sleeve 8 at the common feed point 1c. Gamalielsson FIG. 6:

Fractus Exhibit 2003
Fractus v. Geotab
Page 102 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 103 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
	Claim 7	
7	The wireless handheld or portable device according to claim 1, wherein the at least one frequency band used for wireless connectivity services corresponds to at least one wireless connectivity service selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0004]: > Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS). Saari at [0007]: > WLAN 802.11b mobile communication is a wireless communication standard to cover local areas to supply wireless access to a local area network, e.g., of a company. This standard uses a radio frequency at 2.4 GHz utilising the so-called industrial, scientific and medical (ISM) band. Generally, WLAN communication requires a system of two

Fractus Exhibit 2003
Fractus v. Geotab
Page 104 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		antennas, so called diversity antenna system to improve above all the receiving performance. The operating wave length of WLAN communication is sufficiently short to accommodate conveniently small geometries available in planar antenna elements. In WLAN applications, an indoor environment is typically encountered wherein the propagation of radio waves from one point to another can be greatly affected by the surrounding structures of office areas, and activities taking place within the office area. Due to these effects diversity antennas are used to overcome the problem. Diversity antennas are distinguished by antennas placed in different and favourable positions often orientated in different directions, preferably arranged perpendicularly to each other. Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving.

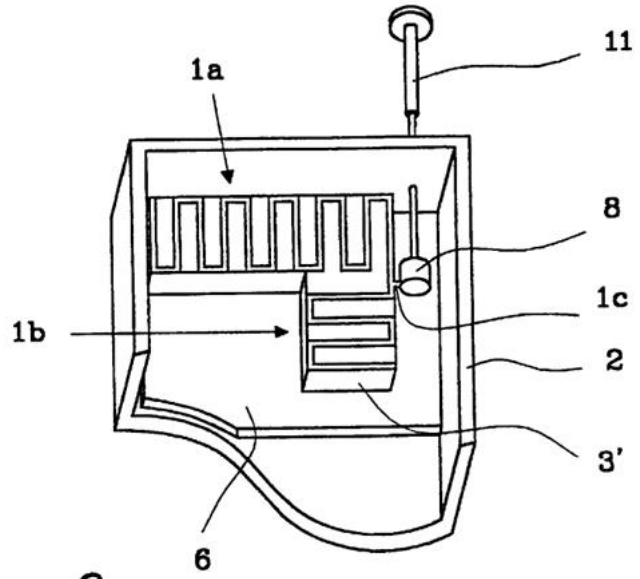
Fractus Exhibit 2003
Fractus v. Geotab
Page 105 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
Claim 8		
8[pre]	A portable device comprising:	*See* above re claim element 1[pre] which is incorporated by reference herein.
8[a]	a ground plane;	*See* above re claim element 1[a] which is incorporated by reference herein.
8[b]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	*See* above re claim element 1[d] which is incorporated by reference herein.
8[c]	the at least three frequency bands being used for mobile communication services;	*See* above re claim element 1[e] which is incorporated by reference herein.
8[d]	a second antenna configured to operate in at least one frequency band;	*See* above re claim element 1[f] which is incorporated by reference herein.
8[e]	the first antenna extends in a direction substantially parallel to a first side of the portable device;	*See* above re claim element 1[h] which is incorporated by reference herein.

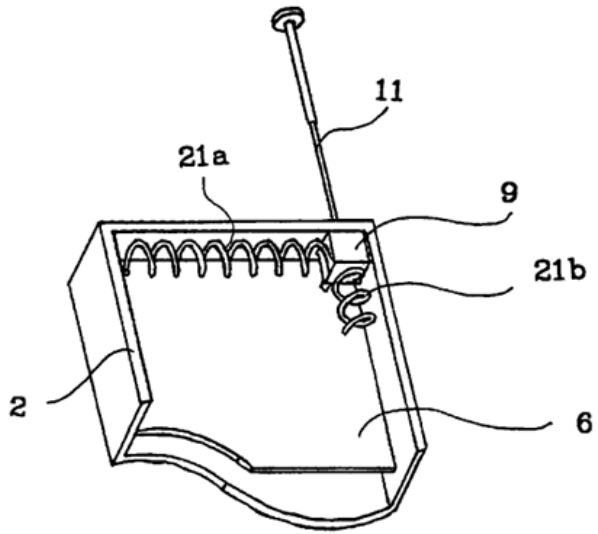
Fractus Exhibit 2003
Fractus v. Geotab
Page 106 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	*See* above re claim element 1[c] which is incorporated by reference herein.
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	*See* above re claim element 1[j] which is incorporated by reference herein.
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	*See* above re claim 3 which is incorporated by reference herein.
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, *See, e.g.*, Gamalielsson at 4:33-48: > In a second embodiment of the antenna device, as shown in FIG. 6, the meander-configured radiating elements 1a and 1b are mounted on a L-shaped support body 3', the first meander radiating element 1a being oriented with its longitudinal axis along one edge (the shorter edge) of the rectangular ground plane means 6, and the other meander

Fractus Exhibit 2003
Fractus v. Geotab
Page 107 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		radiating element 1b being oriented with its longitudinal axis adjacent and in parallel to the adjacent, longer edge of the ground plane means 6. In this case, the common feed point 1c is located relatively close to the upper corner of the elongated box-like casing 2. So, an extendable antenna rod 11 can be conveniently located in this corner region, as is also apparent from FIG. 6. Although not shown specifically, the antenna rod 11 can be retracted fully into the casing upon being slid through the sleeve 8 at the common feed point 1c. Gamalielsson FIG. 6:  Fig. 6

Fractus Exhibit 2003
Fractus v. Geotab
Page 108 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		Gamalielsson FIG. 10:  Fig. 10 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

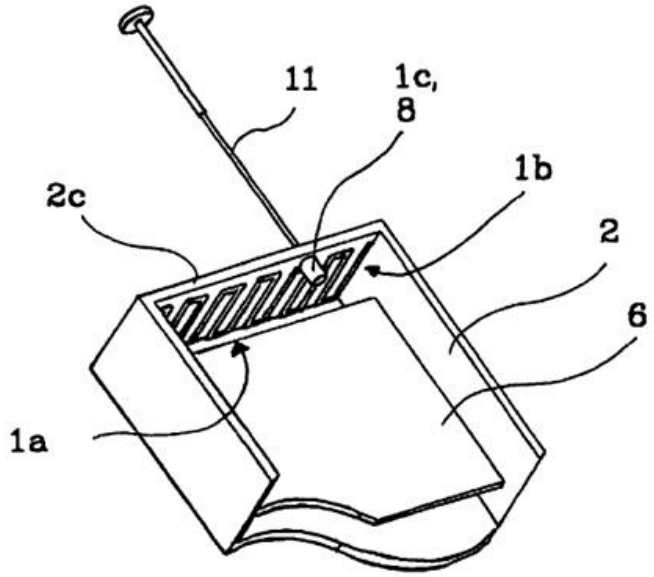
Fractus Exhibit 2003
Fractus v. Geotab
Page 109 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[j]	the first antenna and the second antenna are located internally within the portable device.	*See* above re claim element 1[k] which is incorporated by reference herein.
Claim 9		
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson at 4:49-67: In a third embodiment shown in FIG. 7, two meander configured radiating elements 1a and 1b are mounted onto the upper, shorter end wall 2c of the casing 2. The elements 1a, 1b can be mounted either directly onto the inside of the casing wall 2c, serving as a support means, by means of a printed circuit board or by the intermediary of a plastic foil similar to the one shown in FIG. 12, preferably with only one, two or three flap portions. In this case as well, the first and second radiating elements 1a, 1b have a meander-like pattern with multiple turns along a respective longitudinal axis from a common feed point: 1c. The elements 1a, 1b extends with their respective longitudinal axes in parallel to the shorter edge of the rectangular ground plane means 6, with which the radiating elements cooperate. In this embodiment as well, a retractable antenna rod 11 can be mounted in a guiding sleeve 8 at the common feed point 1c. As appears from FIG. 7, in

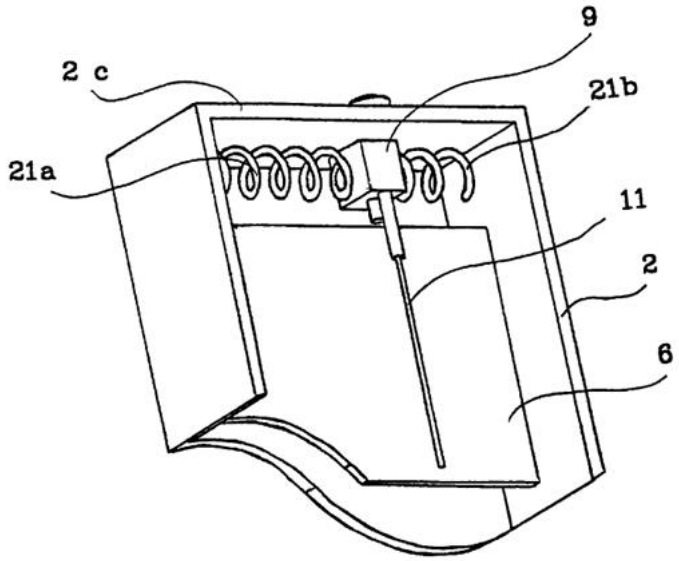
Fractus Exhibit 2003
Fractus v. Geotab
Page 110 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		this third embodiment, the meander elements 1a, and 1b are located in a plane which is perpendicular to the ground plane means 6. Gamalielsson at 5:23-30: In a fifth embodiment shown in FIG. 9, there are also two helical radiating elements 21a and 21b supported by a holding box 9, the difference from FIG. 8 being that the ground plane means 6 is not extended all the way to the end wall 2c of the casing. So, the longitudinal axes of the helical elements 21a 21b are located substantially in the same plane as the ground plane means 6. There is also a rod antenna 11, shown in its retracted position. Gamalielsson FIG. 7:

Fractus Exhibit 2003
Fractus v. Geotab
Page 111 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Gamalielsson FIG. 9:

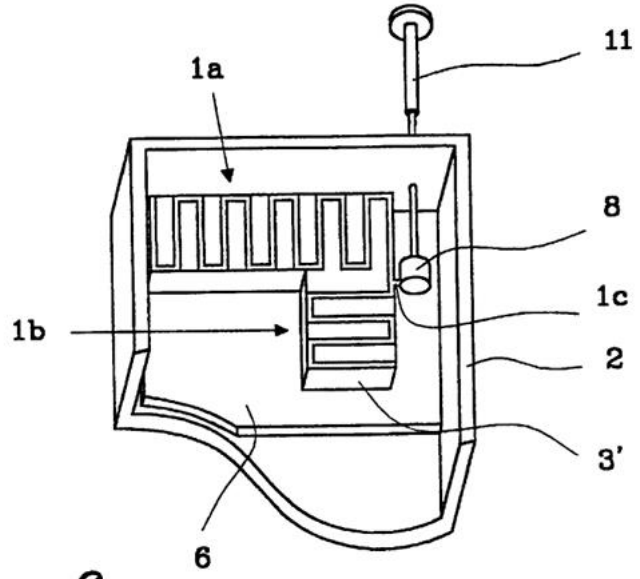
Fractus Exhibit 2003
Fractus v. Geotab
Page 112 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 9 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 113 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
Claim 11		
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Sato at [0040] – [0041]: The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch.
Claim 14		
14[pre]	A wireless handheld or portable device comprising:	*See* above re claim element 1[pre] which is incorporated by reference herein.

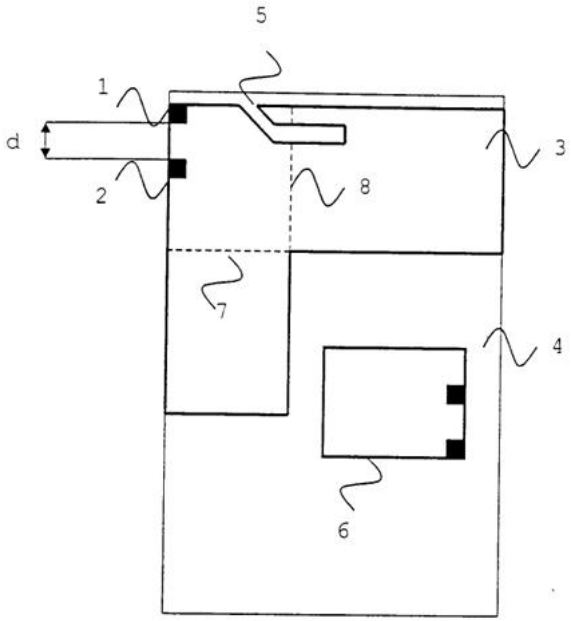
Fractus Exhibit 2003
Fractus v. Geotab
Page 114 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
14[a]	a ground plane;	*See* above re claim element 1[a] which is incorporated by reference herein.
14[b]	the ground plane is inscribed in a first rectangular area comprising a first side, a second side and a third side,	*See* above re claim element 1[b] which is incorporated by reference herein. *See also, e.g.*,: Gamalielsson FIG. 6:  Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

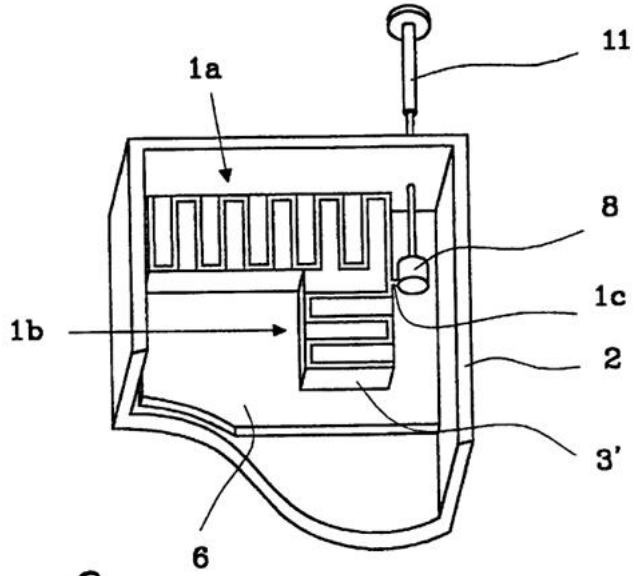
Fractus Exhibit 2003
Fractus v. Geotab
Page 115 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-25: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. > The first planar antenna is as described above. The second planar antenna has a resonance frequency with sufficient bandwidth so that it is possible to utilize in Bluetooth applications. The second planer antenna utilizes the same ground element as the first planar antenna. It can utilize the same transceiver unit as the first planar antenna or a separate transceiver unit whichever is preferred. It is due to the unique shape of the first planar antenna that it is possible to provide the second planar antenna for Bluetooth applications and still get a compact antenna. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 116 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 2
14[c]	a length of the second side being greater than a length of the first side and a length of the third side;	*See* above re claim element 1[c] which is incorporated by reference herein. *See also, e.g.,*:

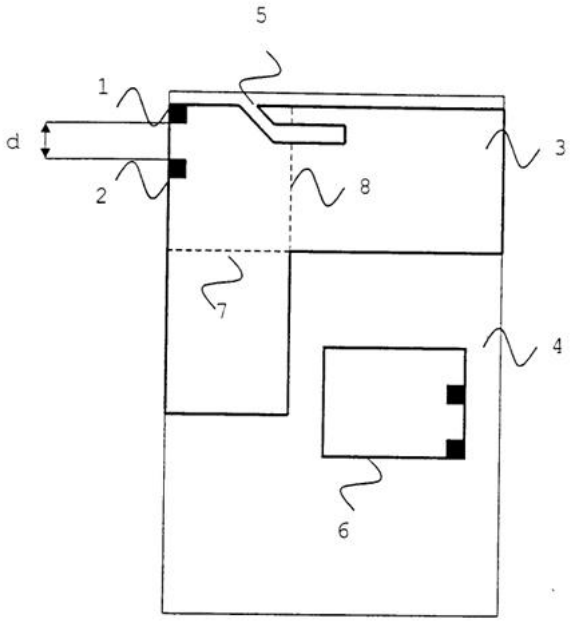
Fractus Exhibit 2003
Fractus v. Geotab
Page 117 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		Gamalielsson FIG. 6:  Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 118 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-25: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. > The first planar antenna is as described above. The second planar antenna has a resonance frequency with sufficient bandwidth so that it is possible to utilize in Bluetooth applications. The second planer antenna utilizes the same ground element as the first planar antenna. It can utilize the same transceiver unit as the first planar antenna or a separate transceiver unit whichever is preferred. It is due to the unique shape of the first planar antenna that it is possible to provide the second planar antenna for Bluetooth applications and still get a compact antenna. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 119 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 2
14[d]	a first antenna configured to transmit and receive electromagnetic waves	*See* above re claim element 1[d] which is incorporated by reference herein.

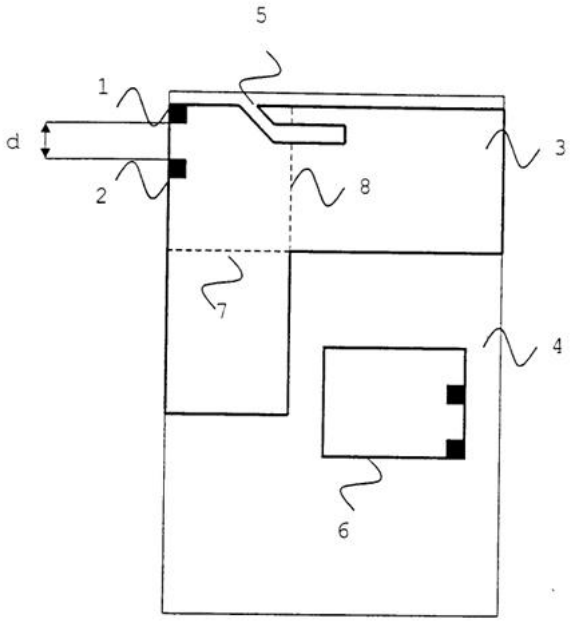
Fractus Exhibit 2003
Fractus v. Geotab
Page 120 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
	corresponding to at least two frequency bands;	
14[e]	the at least two frequency bands being used for mobile communication services;	*See* above re claim element 1[e] which is incorporated by reference herein.
14[f]	a second antenna configured to operate in at least one frequency band;	*See* above re claim element 1[f] which is incorporated by reference herein.
14[g]	the at least one frequency band being different from the at least two frequency bands;	*See* above re claim element 1[g] which is incorporated by reference herein.
14[h]	the first antenna extends in a direction substantially parallel to the first side;	*See* above re claim element 1[h] which is incorporated by reference herein.
14[i]	the first antenna is proximate to the first side;	*See* above re claim element 1[j] which is incorporated by reference herein.
14[j]	the second antenna extends in a direction substantially parallel to the third side;	*See* above re claim element 1[i] which is incorporated by reference herein. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

Fractus Exhibit 2003
Fractus v. Geotab
Page 121 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

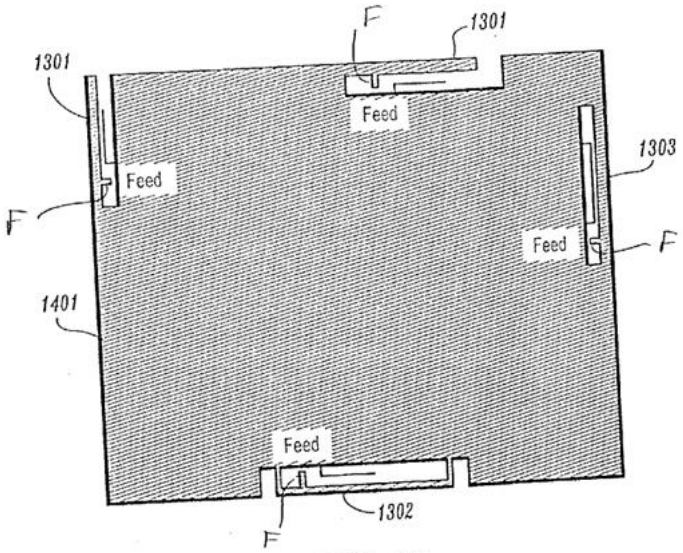
Fractus Exhibit 2003
Fractus v. Geotab
Page 122 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 2 *See also*: Flint at [0056]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 123 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

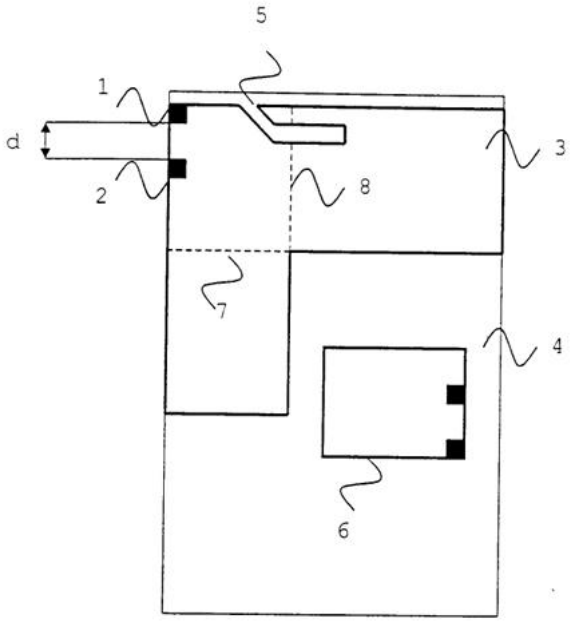
Fractus Exhibit 2003
Fractus v. Geotab
Page 124 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 14
14[k]	the second antenna is proximate to the third side;	*See* above re claim 2 which is incorporated by reference herein. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 125 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

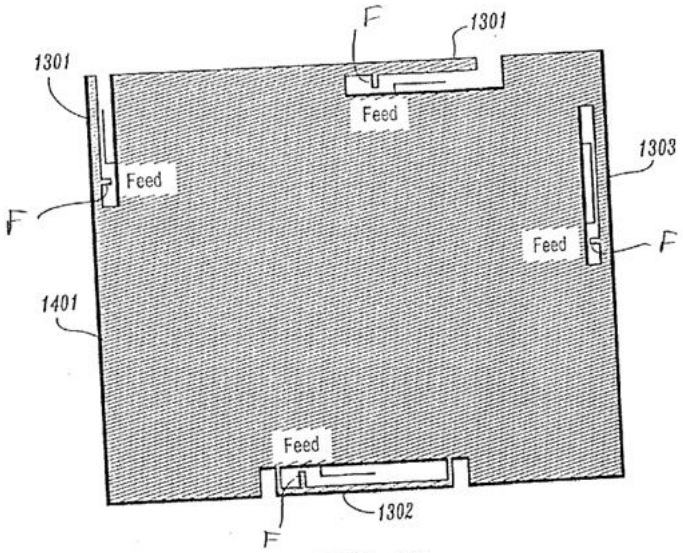
Fractus Exhibit 2003
Fractus v. Geotab
Page 126 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 2 *See also*: Flint at [0056]:

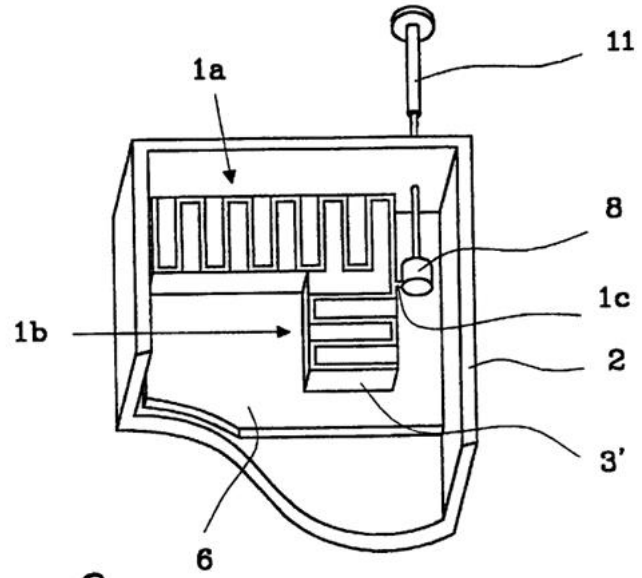
Fractus Exhibit 2003
Fractus v. Geotab
Page 127 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

Fractus Exhibit 2003
Fractus v. Geotab
Page 128 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 14
14[l]	the second antenna is inscribed in a second rectangular area;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*, Gamalielsson FIG. 6:

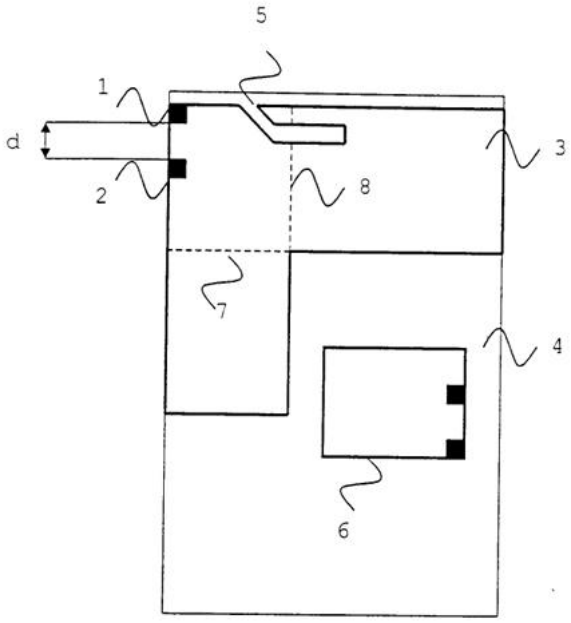
Fractus Exhibit 2003
Fractus v. Geotab
Page 129 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 130 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		See, e.g., Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

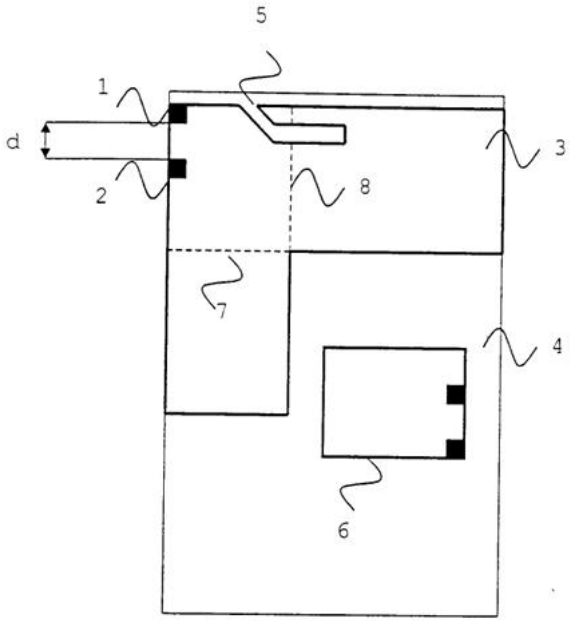
Fractus Exhibit 2003
Fractus v. Geotab
Page 131 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 2
14[m]	a sum of a length and a width of the second rectangular area is smaller than a quarter of an	It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

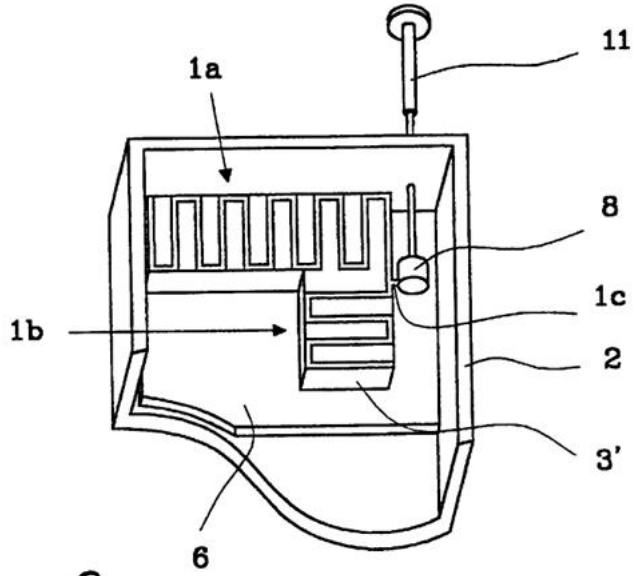
Fractus Exhibit 2003
Fractus v. Geotab
Page 132 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
	operating wavelength of the second antenna;	*See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu at 6:26-30: > The first frequency band mentioned above is about 824-960 MHz (AMPS and GSM 900), said second frequency band is about 1710-1880 MHz (DCS 1800) or 1880-1990 MHz (PCS 1900), and said third frequency band is about 2400-2500 MHz (Bluetooth). A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 133 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 2
14[n]	a geometry of the first antenna being different than a geometry of the second antenna;	Gamalielsson expressly or inherently discloses this claim element. *See, e.g.*,

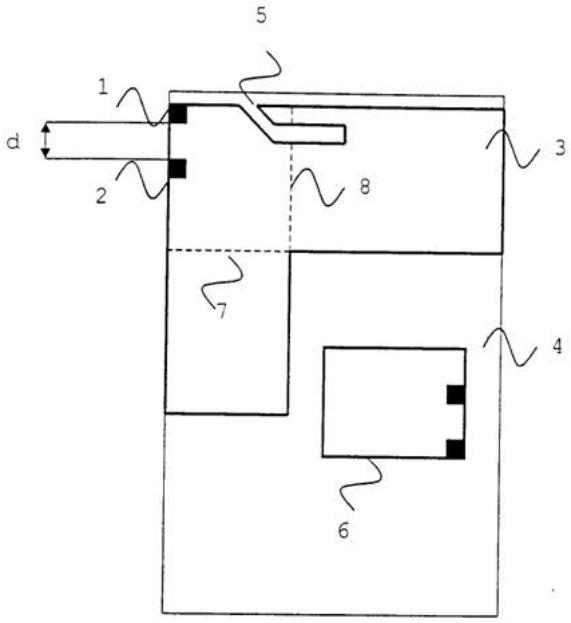
Fractus Exhibit 2003
Fractus v. Geotab
Page 134 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		Gamalielsson FIG. 6:  Fig. 6 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 135 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 136 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
		 FIG. 2
14[o]	at least one of the first antenna and the second antenna is proximate to a corner of the first rectangular area; and	*See* above re claims 3, 4 which are incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 137 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
14[p]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	*See* above re claim element 1[k] which is incorporated by reference herein.
Claim 15		
15[pre]	The wireless handheld or portable device according to claim 14,	*See* above re claim 14 which is incorporated by reference herein.
15[a]	wherein the first antenna is proximate to a first corner of the first rectangular area and	*See* above re claim 4 which is incorporated by reference herein.
15[b]	the second antenna is proximate to a second corner of the first rectangular area.	*See* above re claim 3 which is incorporated by reference herein.
Claim 17		
17	The wireless handheld or portable device according to claim 14, wherein the at least one frequency band is used for a wireless connectivity service selected from the group comprising: Bluetooth™,	*See* above re claim 7 which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 138 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gamalielsson
	IEEE802.11a, IEEE802.11b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	

Fractus Exhibit 2003
Fractus v. Geotab
Page 139 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2 BASED ON U.S. PATENT NO. 6,943,746 TO TALVITIE ET AL ("TALVITIE")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of the asserted claims. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1], particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

U.S. Patent No. 6,943,746 to Talvitie et al. ("Talvitie") was filed on October 23, 2003, issued on September 13, 2005, and claims priority to Finnish Patent Application No. 20021897 filed on October 24, 2002. This patent is prior art under at least 35 U.S.C. § 102(e), and 103(a). As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Talvitie.

To the extent that Talvitie is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Talvitie alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Application Publication No. 2003/0124982 to Saari et al. ("Saari") was filed on October 31, 2002, published on July 3, 2003, and claims priority to October 31, 2001. This patent is prior art under at least 35 U.S.C. § 102(e), and 103(a).
- U.S. Patent No. 6,388,626 to Gamalielsson et al. ("Gamalielsson") was filed on May 14, 1998, issued on May 14, 2002, and claims priority to July 9, 1997. This patent is prior art under at least 35 U.S.C. § 102(a), and 103(a).
- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato") was filed on June 12, 2002, published on March 4, 2004, and claims priority to June 12, 2001. This patent is prior art under at least 35 U.S.C. § 102(e) and 103(a).
- International PCT Application Publication No. WO 01/65636 A1 to Hu ("Hu") was filed on February 20, 2001, published on September 7, 2001, and claims priority to March 2, 2000. This publication is prior art under at least 35 U.S.C. § 102(e) and 103(a).

[1] Defendant understands that, by not charting claims 5-6, 10, 12-13, and 16, 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.

Fractus Exhibit 2003
Fractus v. Geotab
Page 140 of 563

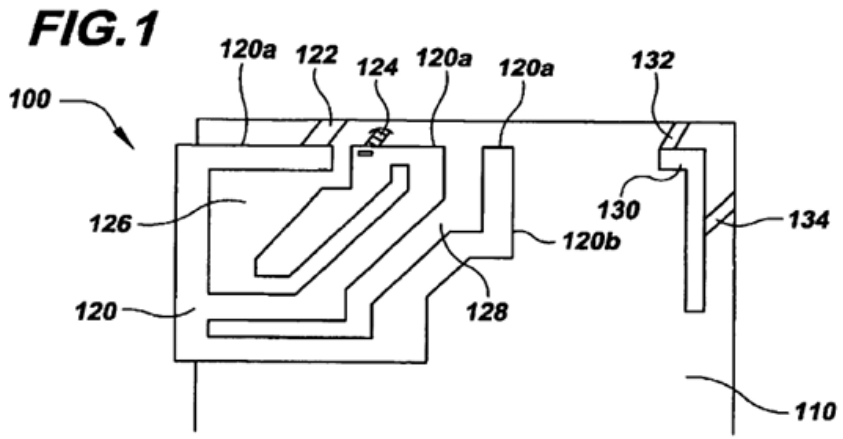
- U.S. Patent Application Publication No. 2003/0222823 to Flint et al ("Flint") was filed on February 20, 2003, published on December 4, 2003, and claims priority to U.S. Patent Application No. 09/866,974 filed on May 29, 2001. This publication is prior art under at least 35 U.S.C. § 102(e) and 103(a).

These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants reserve the right to update their constructions and contentions in view of this Court's claim construction order.[2]

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	Claim 1	
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie at 1:6-9: The invention relates to antenna structures, and particularly to internal antennas used in radio devices, such as mobile stations. Talvitie FIG. 1:

[2] Defendants incorporate herein any related work performed by or on behalf of an author or an inventor in the United States under 35 U.S.C. § 102(g). Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

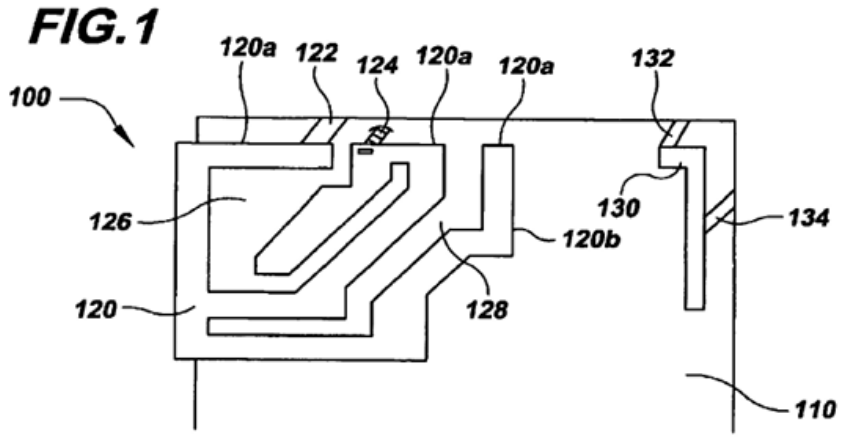
Fractus Exhibit 2003
Fractus v. Geotab
Page 141 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[a]	a ground plane;	Talvitie expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 142 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Talvitie at 3:47-65: Referring to FIG. 1, a preferred embodiment will be described in the following. FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120 and a second radiator 130. The radiators 120, 130 are located at a distance from the ground plane 110 such that air or another dielectric material is, as an isolating material, provided between the ground plane 110 and the radiators 120, 130. The first radiator 120 is a "groove plane antenna" which is connected to the ground plane 110 by a ground point 122 and to which radiation power is fed from a feed point 124. The ground point 122 constituting a grounding line is located substantially at the edge of the radiator 120. The feed point 124 can be implemented as coaxial feed e.g. as a lead-through from the ground plane such that it resides at a substantial distance from the edge of the radiator. The feed point 124 can also be implemented by placing it at the edge of the radiator 120, in a similar manner to that of the ground point. Talvitie FIG. 1:

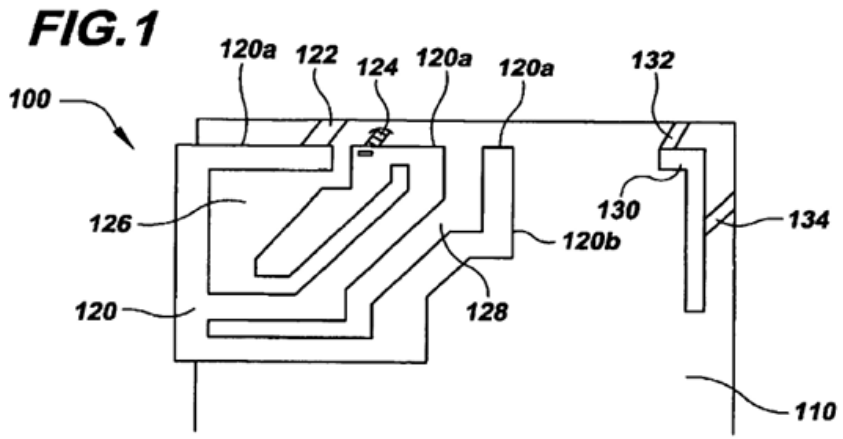
Fractus Exhibit 2003
Fractus v. Geotab
Page 143 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[b]	the ground plane is inscribed in a rectangular area comprising a first side and a second side,	Talvitie expressly or inherently discloses this claim element. *See, e.g.*,

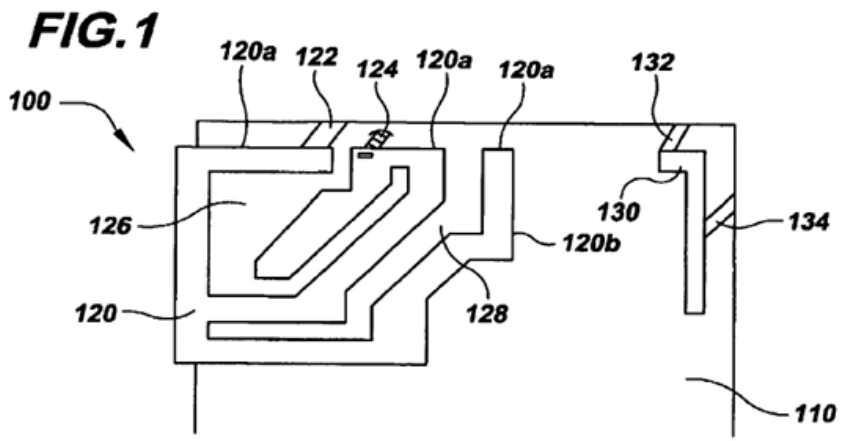
Fractus Exhibit 2003
Fractus v. Geotab
Page 144 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Talvitie at 3:47-65: Referring to FIG. 1, a preferred embodiment will be described in the following. FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120 and a second radiator 130. The radiators 120, 130 are located at a distance from the ground plane 110 such that air or another dielectric material is, as an isolating material, provided between the ground plane 110 and the radiators 120, 130. The first radiator 120 is a "groove plane antenna" which is connected to the ground plane 110 by a ground point 122 and to which radiation power is fed from a feed point 124. The ground point 122 constituting a grounding line is located substantially at the edge of the radiator 120. The feed point 124 can be implemented as coaxial feed e.g. as a lead-through from the ground plane such that it resides at a substantial distance from the edge of the radiator. The feed point 124 can also be implemented by placing it at the edge of the radiator 120, in a similar manner to that of the ground point. Talvitie FIG. 1:

Fractus Exhibit 2003
Fractus v. Geotab
Page 145 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[c]	a length of the second side being greater than a length of the first side;	Talvitie expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[d]	a first antenna configured to transmit and receive electromagnetic waves	Talvitie expressly or inherently discloses this claim element.

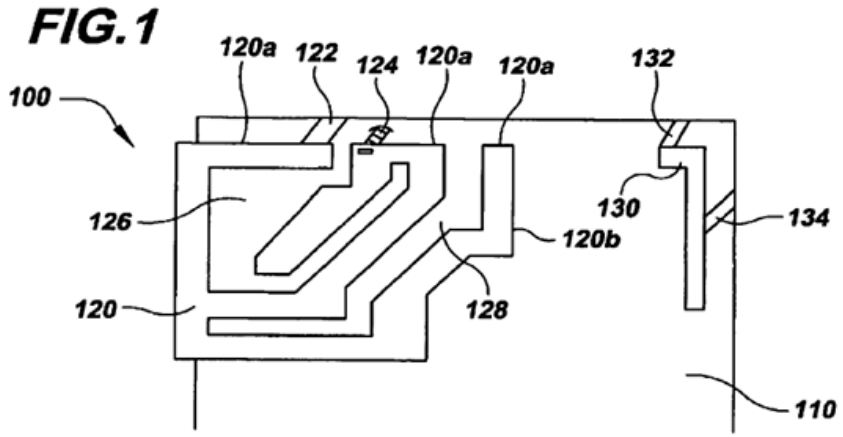
Fractus Exhibit 2003
Fractus v. Geotab
Page 147 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	corresponding to at least three frequency bands;	*See, e.g.*, Talvitie at 3:47-4:24: Referring to FIG. 1, a preferred embodiment will be described in the following. FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120 and a second radiator 130. The radiators 120, 130 are located at a distance from the ground plane 110 such that air or another dielectric material is, as an isolating material, provided between the ground plane 110 and the radiators 120, 130. The first radiator 120 is a "groove plane antenna" which is connected to the ground plane 110 by a ground point 122 and to which radiation power is fed from a feed point 124. The ground point 122 constituting a grounding line is located substantially at the edge of the radiator 120. The feed point 124 can be implemented as coaxial feed e.g. as a lead-through from the ground plane such that it resides at a substantial distance from the edge of the radiator. The feed point 124 can also be implemented by placing it at the edge of the radiator 120, in a similar manner to that of the ground point. The planar radiator 120 is provided with a first groove 126 and a second groove 128, which are sections containing no electrically conductive material. Such a groove plane antenna structure is suitable for use in more than one frequency range. An open end of the first groove 126 resides at the edge 120a of the radiator 120, between the ground point 122 and the feed point 124. An open end of the second groove 128 resides at the edge 120a of the radiator, between the feed point 124 and the edge 120b. The second groove 128 is to produce a lower frequency range by separating a right-hand branch from the radiator, whereas the first groove 126 residing between the ground point 122 and the feed point 124 further divides the radiator 120 into two different branches, i.e. an element facing the ground point and an element facing the feed point, which are responsible for producing the higher frequency ranges. In order for the groove plane antenna to operate as desired, the first groove 126 is placed in the radiator between the ground point 122 and

Fractus Exhibit 2003
Fractus v. Geotab
Page 148 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		the feed point 124 such that a line segment provided between the ground point 122 and the feed point 124 intersects with the first groove 126, whereby a smaller portion of the groove 126 is provided on the side of the open end of the groove 126 of the particular line segment, i.e. on the side of the edge 120a. The proportion of the smaller portion of the first groove 126 of the surface area of the entire groove 126 is typically of the order of few percentages at its maximum. Talvitie at 5:1-13: The antenna structure of FIG. 1 can preferably be configured to operate as an antenna structure for a multifrequency mobile station. An example of a multifrequency mobile station is a mobile station configured to support EGSM 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges. The GSM 1900 and WCDMA 2000 frequency ranges then partly overlap. A similar situation occurs in a mobile station employing the US-WCDMA 1900 (1850 to 1990 MHz) and GSM 1900 (1850 to 1990 MHz) frequency ranges or US-WCDMA 1700/2100 (Tx 1710 to 1770 MHz, Rx 2110 to 2170 MHz) and GSM 1800, (1710 to 1880 MHz) systems. Talvitie FIG. 1:

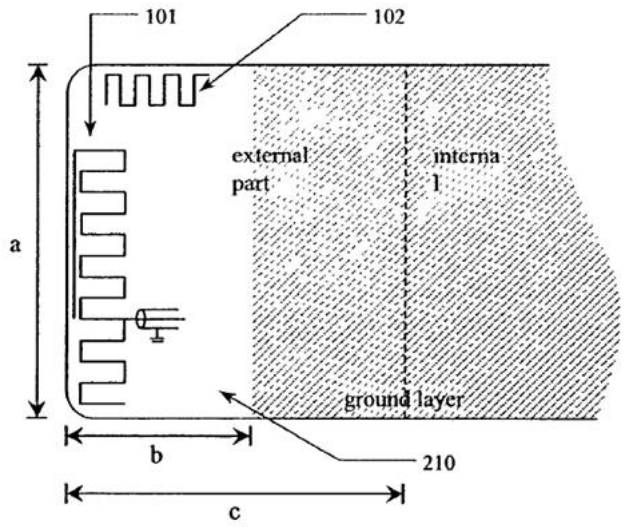
Fractus Exhibit 2003
Fractus v. Geotab
Page 149 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0106]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 150 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		FIG. 6a shows one of the antennas of the antenna system of the present invention. The antenna shown is the main antenna used for E-GSM/DCS communication and WLAN/ISM communication. The feedpoint of the antenna is placed substantially in the middle of the antenna structure. The left and right side structure parts relating to the feed point are connected galvanically and parasitically to each other. According to the operation frequency the length of the left antenna structure side is adapted for WLAN operation on the ISM band, i.e., at a resonant frequency of 2.4 GHz. The right side of the antenna structure relating to the feed point of the antenna is prepared for operation on the E-GSM/DCS frequencies, i.e., on the E-GSM/GSM frequencies of 900 MHz and 1.8 GHz and on the DCS frequency of 1.9 GHz. The antenna structure itself consists of a normal meander line including a feedback line. The design of the E-GSM/DCS structure part of the main antenna is carried out according to dual or triple band antennas which are described in several patents such as EP 0 923 158 A2 or EP 0 938 158 A2. Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are

Fractus Exhibit 2003
Fractus v. Geotab
Page 151 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:  Fig. 6b
1[e]	the at least three frequency bands being used for mobile communication services;	Talvitie expressly or inherently discloses this claim element. *See, e.g.*,

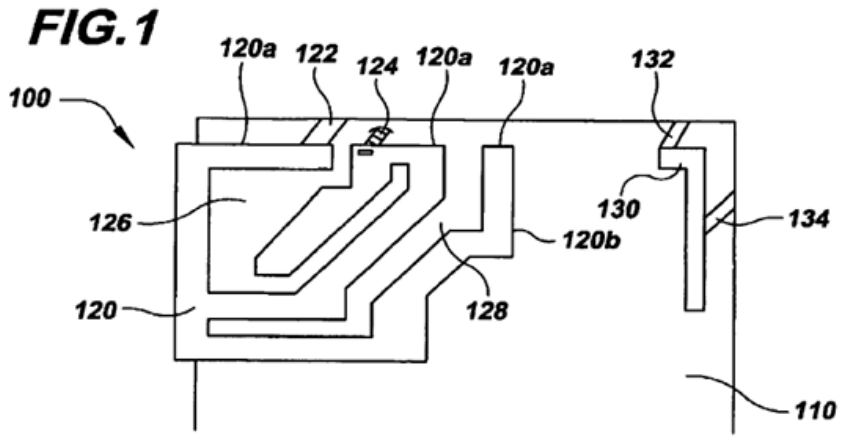
Fractus Exhibit 2003
Fractus v. Geotab
Page 152 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Talvitie at 1:12-25: As wireless communication becomes increasingly common, more new frequency ranges are needed for different wireless systems. Meanwhile the demand for wireless terminal equipment, such as mobile stations, supporting several wireless systems is also on the increase. The most recent mobile station models typically employ several of the following systems and frequency ranges: EGSM 900 (880 to 960 MHz), GSM 1800 (1710 to 1880 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA2000 (1920 to 2170 MHz), US-GSM 850 (824 to 894 MHz), US-WCDMA 1900 (1850 to 1990 MHz) and US-WCDMA 1700/2100 (Tx 1710 to 1770 MHz, Rx 2110 to 2170 MHz). GSM 1900 and some WCDMA frequency ranges, for example, then at least partly overlap. Talvitie at 4:31-40: As to the present embodiment, the point is that the groove plane antenna is configured to radiate at least within one lower frequency range and within one or more higher frequency ranges. In connection with the present application, frequencies substantially slightly below 1 GHz (approximately 800 to 1000 MHz) are regarded as lower frequency ranges while frequencies substantially of 2 GHz (approximately 1700 to 2200 MHz) are regarded as higher frequency ranges, these frequency ranges are usually used by different mobile communication systems. Talvitie at 5:1-13: The antenna structure of FIG. 1 can preferably be configured to operate as an antenna structure for a multifrequency mobile station. An example of a multifrequency mobile station is a mobile station configured to support EGSM 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges. The GSM 1900 and WCDMA 2000 frequency ranges then partly overlap. A similar situation occurs in a mobile station employing the US-WCDMA 1900 (1850 to

Fractus Exhibit 2003
Fractus v. Geotab
Page 153 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		1990 MHz) and GSM 1900 (1850 to 1990 MHz) frequency ranges or US-WCDMA 1700/2100 (Tx 1710 to 1770 MHz, Rx 2110 to 2170 MHz) and GSM 1800, (1710 to 1880 MHz) systems. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[f]	a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band;	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie at 4:47-67: The second radiator 130 is a narrow, planar radiator whose surface area in this embodiment is substantially smaller than that of the first radiator 120. The second radiator 130 also comprises a ground point 132 connecting the radiator 130 to a ground plane 110, and a feed point 134 feeding radiation power. The ground point 132 constituting a grounding line is located substantially at the edge of the radiator 130. The feed point 134 can be implemented as coaxial feed e.g. as a lead-through from the ground plane such that it resides at a substantial distance from the edge of the radiator. The feed point 134 can also be implemented by placing it at the edge of the radiator 130, in a similar manner to that of the ground point. The second radiator is configured to radiate within a frequency range at least partly overlapping with at least one frequency range, preferably with a

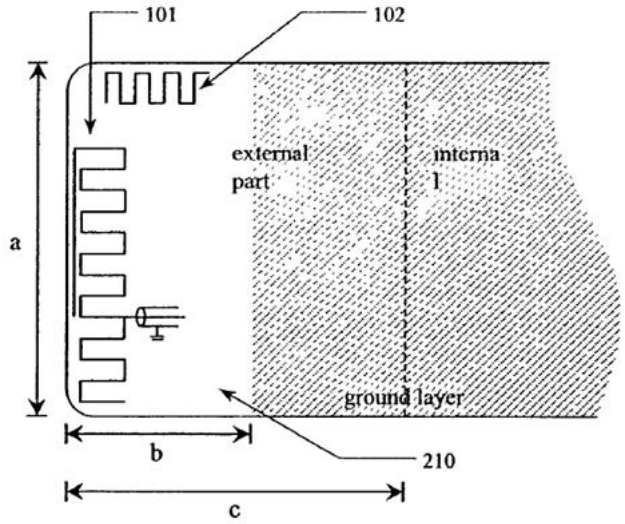
Fractus Exhibit 2003
Fractus v. Geotab
Page 154 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		higher frequency range, of the first radiator. As far as the operation of the present embodiments is concerned, the shape or location of the second radiator 130 with respect to the first radiator 120 is irrelevant; the only point is that both radiators are provided with a feed point of their own and, preferably but not necessarily, a common ground plane. Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 156 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 Fig. 6b
1[g]	the at least one frequency band being used for wireless connectivity services;	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie at 8:64-9:19: For illustrative reasons, different GSM and WCDMA systems have been used as examples in the above embodiments that can preferably be applied in connection with the antenna structure of the invention. However, it is obvious for one skilled in the art that the considerably strong isolation achieved by the antenna structure of the invention can also

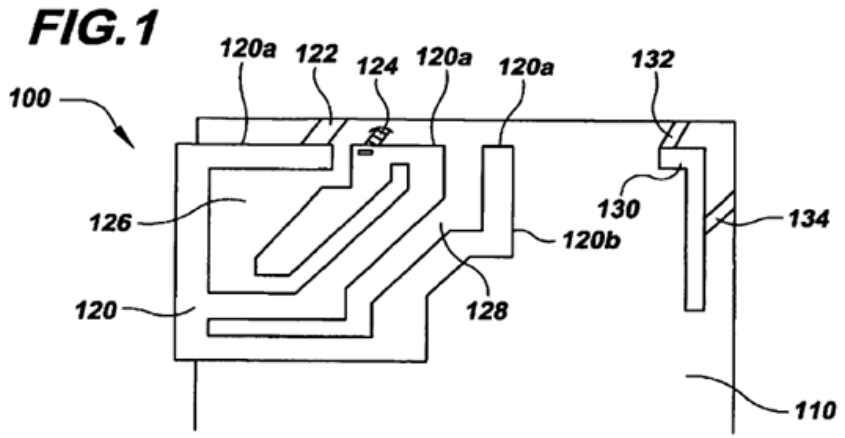
Fractus Exhibit 2003
Fractus v. Geotab
Page 157 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		be utilized in connection with any other wireless data transfer wherein transmission and reception take place simultaneously substantially within the same or adjacent frequency ranges. Consequently, the antenna structure of the invention can preferably be applied e.g. to a wireless local area network system IEEE 802.11b utilizing spread spectrum technology and to a wireless Bluetooth system utilizing time division technology, both operating within a frequency range of 2400 to 2483.5 MHz. Despite the overlapping nature of the frequency ranges, both systems can preferably be coupled to the antenna structure of the invention. Furthermore, strong isolation is to be provided between an antenna used for GPS satellite positioning and antennas of different cellular mobile communication systems although the frequency range of the GPS system (1227/1575 MHz) does not overlap with the commonly used cellular mobile communication systems. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0004]: Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile

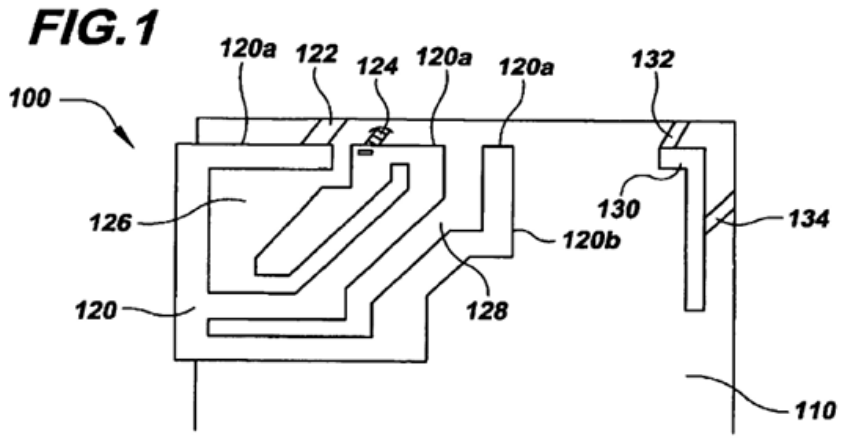
Fractus Exhibit 2003
Fractus v. Geotab
Page 158 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS). Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving.

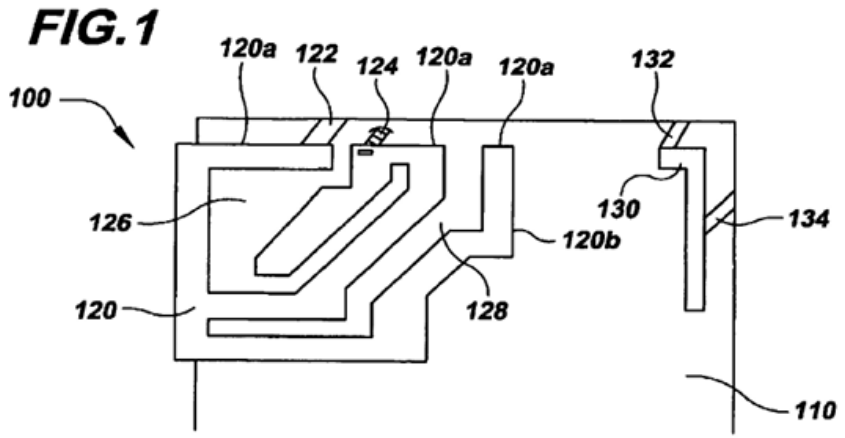
Fractus Exhibit 2003
Fractus v. Geotab
Page 159 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
1[h]	the first antenna extends in a direction substantially parallel to the first side;	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 160 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
1[i]	the second antenna extends in a direction substantially parallel to the second side;	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

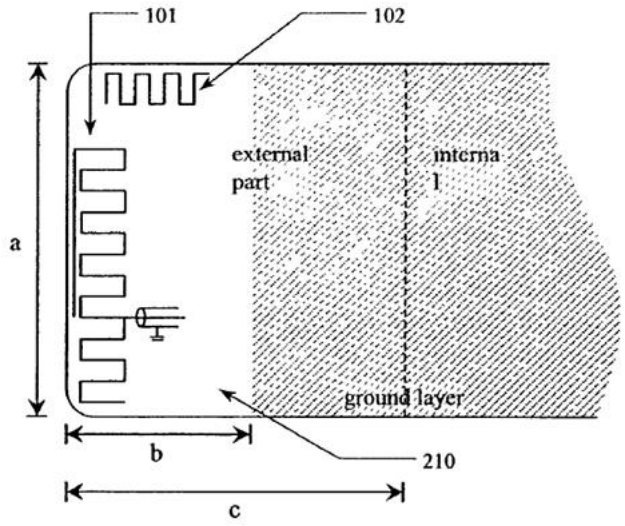
Fractus Exhibit 2003
Fractus v. Geotab
Page 161 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
1[j]	the first antenna is arranged substantially close to the first side; and	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

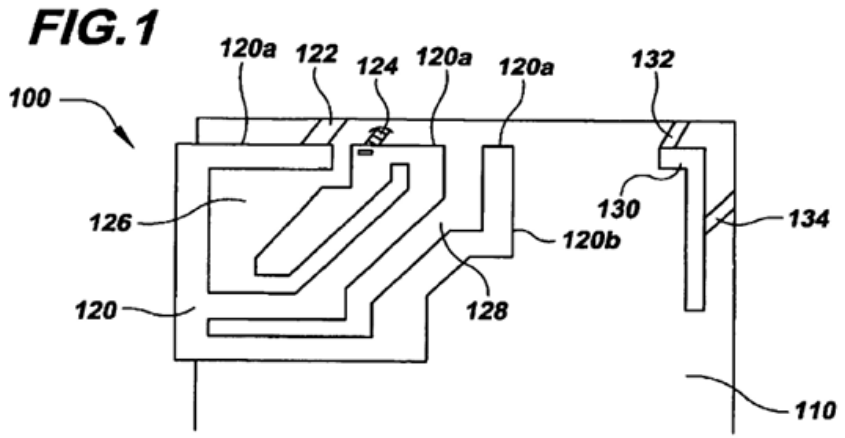
Fractus Exhibit 2003
Fractus v. Geotab
Page 162 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie at 1-6:9: > The invention relates to antenna structures, and particularly to internal antennas used in radio devices, such as mobile stations. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0110]: > The schematic view in FIG. 6b shows the arrangement of the antenna structure used in a PCMCIA/PCCARD especially for mobile devices containing a PCMCIA/PC CARD interface. The design of the PWB 210 supporting the antenna system according to the present invention has also to consider the distance to the device housing to ensure sufficient distance between antennas and conductor to prevent any type of coupling effects. Therefore, the antenna system is placed inside an external plastic housing part of the PCMCIA/PCCARD extending out of the PCMCIA/PC CARD interface insertion.

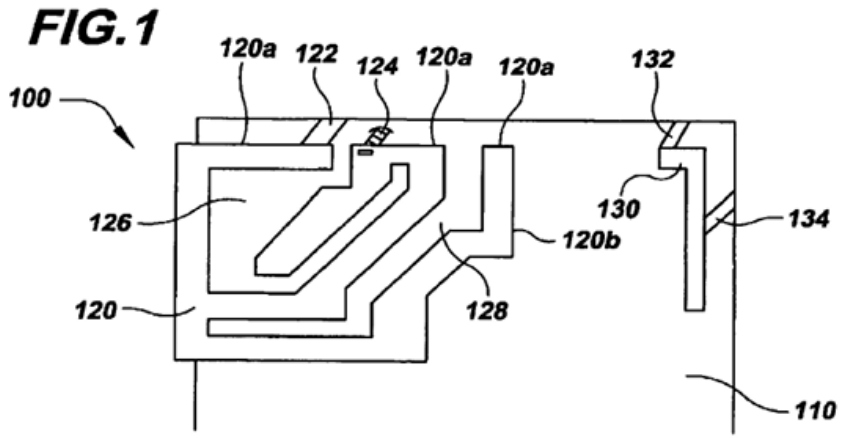
Fractus Exhibit 2003
Fractus v. Geotab
Page 163 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		This external plastic housing part has a size at least of 40 mm relating to distance a to 50 mm relating to distance c. The properties of the FR4 substrate material employed for the PWB 210 and the size and height of the antenna system placed on the PWB210 enables to use a low-profile extension housing of the height of only 5 mm. Saari FIG. 6b:  Fig. 6b
Claim 2		

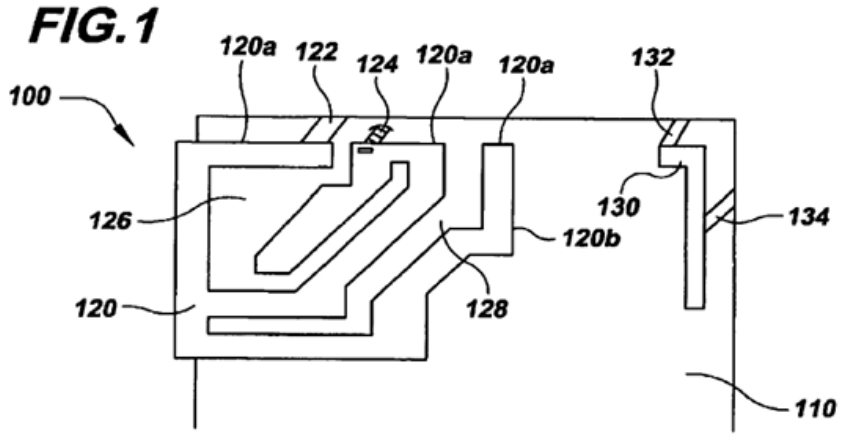
Fractus Exhibit 2003
Fractus v. Geotab
Page 164 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
2	The wireless handheld or portable device according to claim 1, wherein the second antenna is arranged substantially close to the second side.	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 165 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	Claim 3	
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially close to a corner of the rectangular area.	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 166 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
Claim 4		
4	The wireless handheld or portable device according to claim 1, wherein the first antenna is arranged substantially close to a corner of the rectangular area.	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

Fractus Exhibit 2003
Fractus v. Geotab
Page 167 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
Claim 7		
7	The wireless handheld or portable device according to claim 1, wherein the at least one frequency band used for wireless connectivity services corresponds to at least one wireless connectivity service selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie at 8:64-9:19: > For illustrative reasons, different GSM and WCDMA systems have been used as examples in the above embodiments that can preferably be applied in connection with the antenna structure of the invention. However, it is obvious for one skilled in the art that the considerably strong isolation achieved by the antenna structure of the invention can also be utilized in connection with any other wireless data transfer wherein transmission and reception take place simultaneously substantially within the same or adjacent frequency ranges. Consequently, the antenna structure of the invention can preferably be applied e.g. to a wireless local area network system IEEE 802.11b utilizing spread spectrum technology and to a wireless Bluetooth system utilizing time division technology, both operating within a frequency range of 2400 to 2483.5 MHz. Despite the overlapping nature of the frequency ranges, both systems can preferably be coupled to the antenna structure of the invention. Furthermore, strong isolation is to be provided between an antenna used for GPS satellite positioning and antennas of different cellular mobile

Fractus Exhibit 2003
Fractus v. Geotab
Page 168 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		communication systems although the frequency range of the GPS system (1227/1575 MHz) does not overlap with the commonly used cellular mobile communication systems. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0004]: Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS).

Fractus Exhibit 2003
Fractus v. Geotab
Page 169 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Saari at [0007]: WLAN 802.11b mobile communication is a wireless communication standard to cover local areas to supply wireless access to a local area network, e.g., of a company. This standard uses a radio frequency at 2.4 GHz utilising the so-called industrial, scientific and medical (ISM) band. Generally, WLAN communication requires a system of two antennas, so called diversity antenna system to improve above all the receiving performance. The operating wave length of WLAN communication is sufficiently short to accommodate conveniently small geometries available in planar antenna elements. In WLAN applications, an indoor environment is typically encountered wherein the propagation of radio waves from one point to another can be greatly affected by the surrounding structures of office areas, and activities taking place within the office area. Due to these effects diversity antennas are used to overcome the problem. Diversity antennas are distinguished by antennas placed in different and favourable positions often orientated in different directions, preferably arranged perpendicularly to each other. Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and

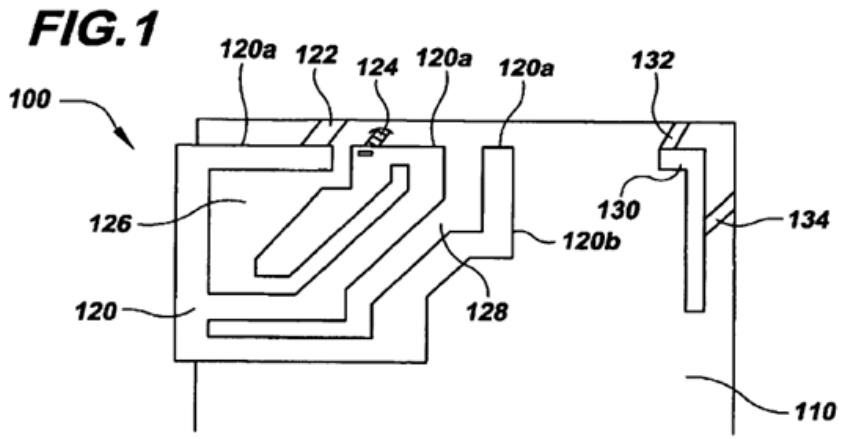
Fractus Exhibit 2003
Fractus v. Geotab
Page 170 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving.
Claim 8		
8[pre]	A portable device comprising:	*See* above re claim element 1[pre] which is incorporated by reference herein.
8[a]	a ground plane;	*See* above re claim element 1[a] which is incorporated by reference herein.
8[b]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	*See* above re claim element 1[d] which is incorporated by reference herein.
8[c]	the at least three frequency bands being used for mobile communication services;	*See* above re claim element 1[e] which is incorporated by reference herein.
8[d]	a second antenna configured to operate in at least one frequency band;	*See* above re claim element 1[f] which is incorporated by reference herein.
8[e]	the first antenna extends in a direction substantially parallel	*See* above re claim element 1[h] which is incorporated by reference herein.

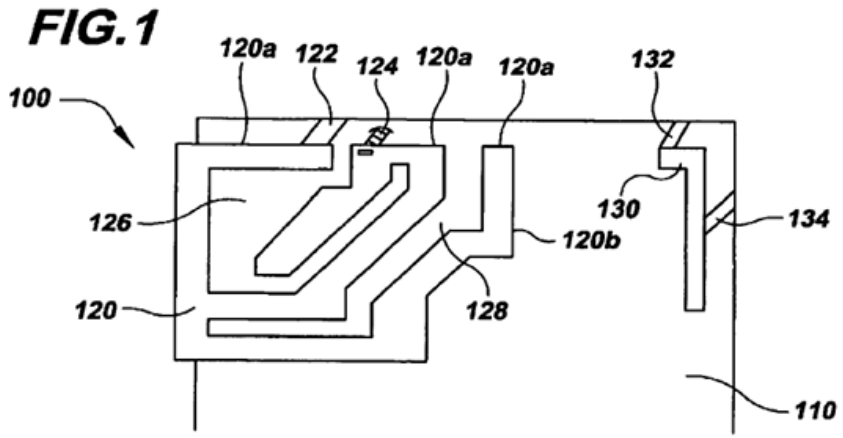
Fractus Exhibit 2003
Fractus v. Geotab
Page 171 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	to a first side of the portable device;	
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	*See* above re claim element 1[c] which is incorporated by reference herein.
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	*See* above re claim element 1[j] which is incorporated by reference herein.
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	*See* above re claim 3 which is incorporated by reference herein.
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie FIG. 1:

Fractus Exhibit 2003
Fractus v. Geotab
Page 172 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[j]	the first antenna and the second antenna are located internally within the portable device.	*See* above re claim element 1[k] which is incorporated by reference herein.

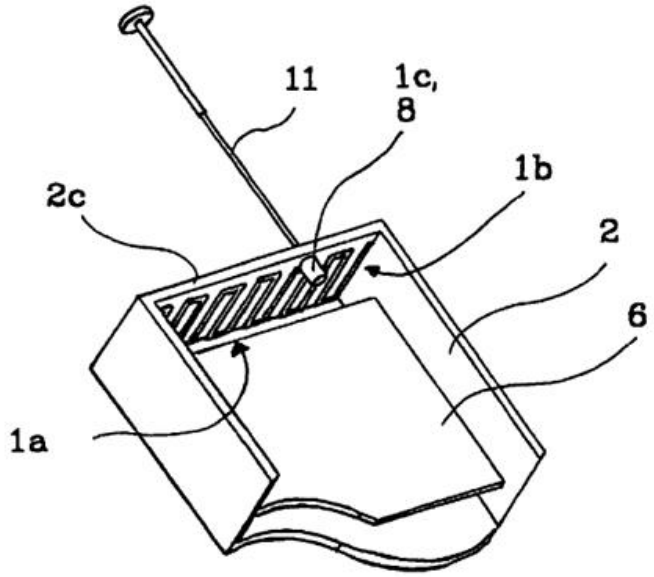
Fractus Exhibit 2003
Fractus v. Geotab
Page 173 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	Claim 9	
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

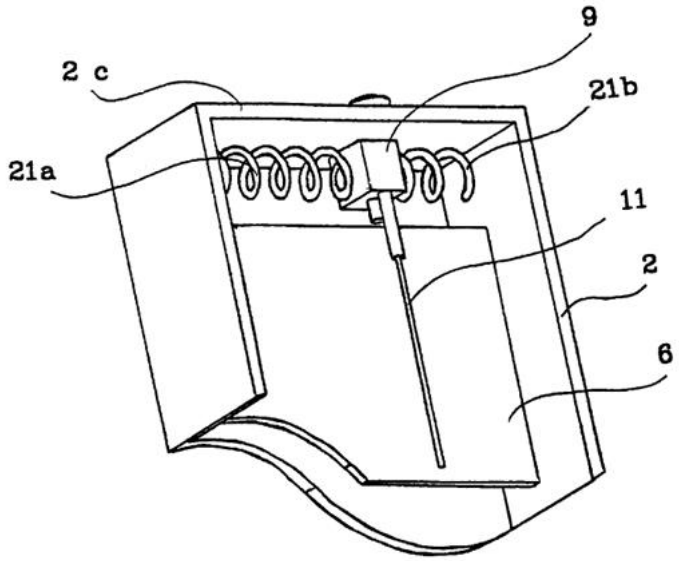
Fractus Exhibit 2003
Fractus v. Geotab
Page 174 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.,* Gamalielsson at 4:49-67: In a third embodiment shown in FIG. 7, two meander configured radiating elements 1a and 1b are mounted onto the upper, shorter end wall 2c of the casing 2. The elements 1a, 1b can be mounted either directly onto the inside of the casing wall 2c, serving as a support means, by means of a printed circuit board or by the intermediary of a plastic foil similar to the one shown in FIG. 12, preferably with only one, two or three flap portions. In this case as well, the first and second radiating elements 1a, 1b have a meander-like pattern with multiple turns along a respective longitudinal axis from a common feed point: 1c. The elements 1a, 1b extends with their respective longitudinal axes in parallel to the shorter edge of the rectangular ground plane means 6, with which the radiating elements cooperate. In this embodiment as well, a retractable antenna rod 11 can be mounted in a guiding sleeve 8 at the common feed point 1c. As appears from FIG. 7, in this third embodiment, the meander elements 1a, and 1b are located in a plane which is perpendicular to the ground plane means 6. Gamalielsson at 5:23-30: In a fifth embodiment shown in FIG. 9, there are also two helical radiating elements 21a and 21b supported by a holding box 9, the difference from FIG. 8 being that the ground plane means 6 is not extended all the way to the end wall 2c of the casing. So, the longitudinal axes of the helical elements 21a 21b are located substantially in the same

Fractus Exhibit 2003
Fractus v. Geotab
Page 175 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		plane as the ground plane means 6. There is also a rod antenna 11, shown in its retracted position. Gamalielsson FIG. 7:  Gamalielsson FIG. 9:

Fractus Exhibit 2003
Fractus v. Geotab
Page 176 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 Fig. 9
Claim 11		
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different	Talvitie expressly or inherently discloses this claim element. *See, e.g.*, Talvitie at 3:47-4:24:

Fractus Exhibit 2003
Fractus v. Geotab
Page 177 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	from the at least three frequency bands.	Referring to FIG. 1, a preferred embodiment will be described in the following. FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120 and a second radiator 130. The radiators 120, 130 are located at a distance from the ground plane 110 such that air or another dielectric material is, as an isolating material, provided between the ground plane 110 and the radiators 120, 130. The first radiator 120 is a "groove plane antenna" which is connected to the ground plane 110 by a ground point 122 and to which radiation power is fed from a feed point 124. The ground point 122 constituting a grounding line is located substantially at the edge of the radiator 120. The feed point 124 can be implemented as coaxial feed e.g. as a lead-through from the ground plane such that it resides at a substantial distance from the edge of the radiator. The feed point 124 can also be implemented by placing it at the edge of the radiator 120, in a similar manner to that of the ground point. The planar radiator 120 is provided with a first groove 126 and a second groove 128, which are sections containing no electrically conductive material. Such a groove plane antenna structure is suitable for use in more than one frequency range. An open end of the first groove 126 resides at the edge 120a of the radiator 120, between the ground point 122 and the feed point 124. An open end of the second groove 128 resides at the edge 120a of the radiator, between the feed point 124 and the edge 120b. The second groove 128 is to produce a lower frequency range by separating a right-hand branch from the radiator, whereas the first groove 126 residing between the ground point 122 and the feed point 124 further divides the radiator 120 into two different branches, i.e. an element facing the ground point and an element facing the feed point, which are responsible for producing the higher frequency ranges. In order for the groove plane antenna to operate as desired, the first groove 126 is placed in the radiator between the ground point 122 and the feed point 124 such that a line segment provided between the ground point 122 and the feed point 124 intersects with the first groove 126, whereby a smaller portion of the groove 126 is provided on the side of the open end of the groove 126 of the particular line

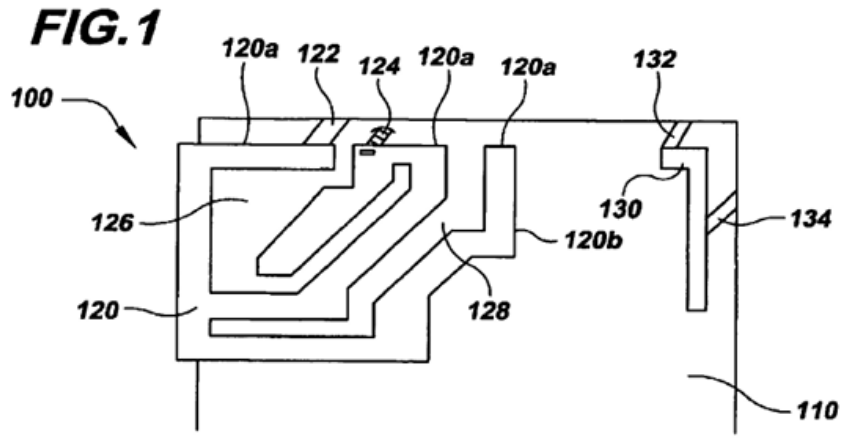
Fractus Exhibit 2003
Fractus v. Geotab
Page 178 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		segment, i.e. on the side of the edge 120a. The proportion of the smaller portion of the first groove 126 of the surface area of the entire groove 126 is typically of the order of few percentages at its maximum. Talvitie at 4:47-5:13: The second radiator 130 is a narrow, planar radiator whose surface area in this embodiment is substantially smaller than that of the first radiator 120. The second radiator 130 also comprises a ground point 132 connecting the radiator 130 to a ground plane 110, and a feed point 134 feeding radiation power. The ground point 132 constituting a grounding line is located substantially at the edge of the radiator 130. The feed point 134 can be implemented as coaxial feed e.g. as a lead-through from the ground plane such that it resides at a substantial distance from the edge of the radiator. The feed point 134 can also be implemented by placing it at the edge of the radiator 130, in a similar manner to that of the ground point. The second radiator is configured to radiate within a frequency range at least partly overlapping with at least one frequency range, preferably with a higher frequency range, of the first radiator. As far as the operation of the present embodiments is concerned, the shape or location of the second radiator 130 with respect to the first radiator 120 is irrelevant; the only point is that both radiators are provided with a feed point of their own and, preferably but not necessarily, a common ground plane. The antenna structure of FIG. 1 can preferably be configured to operate as an antenna structure for a multifrequency mobile station. An example of a multifrequency mobile station is a mobile station configured to support EGSM 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges. The GSM 1900 and WCDMA 2000 frequency ranges then partly overlap. A similar situation occurs in a mobile station employing the US-WCDMA 1900 (1850 to 1990 MHz) and GSM 1900 (1850 to 1990 MHz) frequency ranges or US-WCDMA

Fractus Exhibit 2003
Fractus v. Geotab
Page 179 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		1700/2100 (Tx 1710 to 1770 MHz, Rx 2110 to 2170 MHz) and GSM 1800, (1710 to 1880 MHz) systems. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Sato at [0040] – [0041]: The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch.

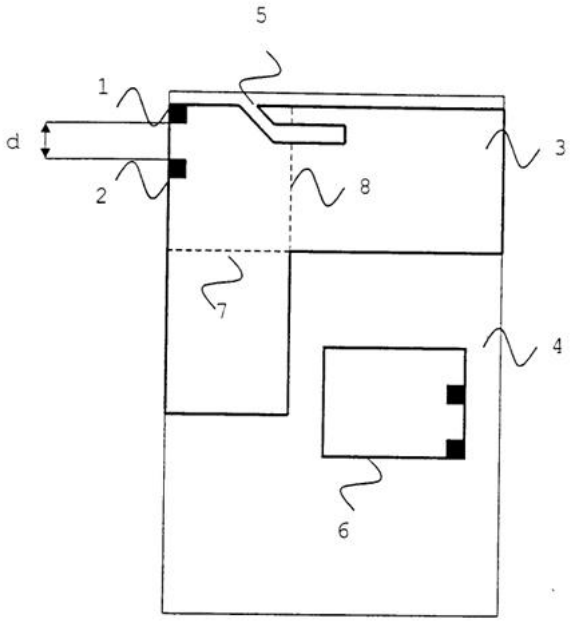
Fractus Exhibit 2003
Fractus v. Geotab
Page 180 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
Claim 14		
14[pre]	A wireless handheld or portable device comprising:	*See* above re claim element 1[pre] which is incorporated by reference herein.
14[a]	a ground plane;	*See* above re claim element 1[a] which is incorporated by reference herein.
14[b]	the ground plane is inscribed in a first rectangular area comprising a first side, a second side and a third side,	*See* above re claim element 1[b] which is incorporated by reference herein. *See also, e.g.*: Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

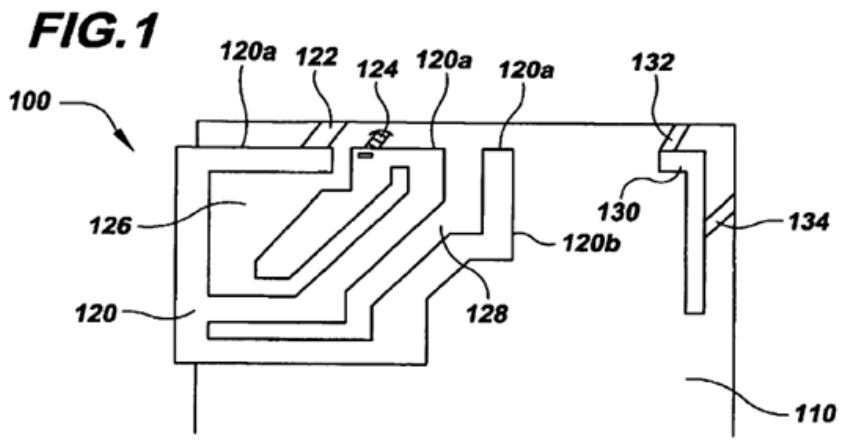
Fractus Exhibit 2003
Fractus v. Geotab
Page 181 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-25: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. > The first planar antenna is as described above. The second planar antenna has a resonance frequency with sufficient bandwidth so that it is possible to utilize in Bluetooth applications. The second planer antenna utilizes the same ground element as the first planar antenna. It can utilize the same transceiver unit as the first planar antenna or a separate transceiver unit whichever is preferred. It is due to the unique shape of the first planar antenna that it is possible to provide the second planar antenna for Bluetooth applications and still get a compact antenna. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 182 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 2
14[c]	a length of the second side being greater than a length of the first side and a length of the third side;	*See* above re claim element 1[c] which is incorporated by reference herein. *See also, e.g.*:

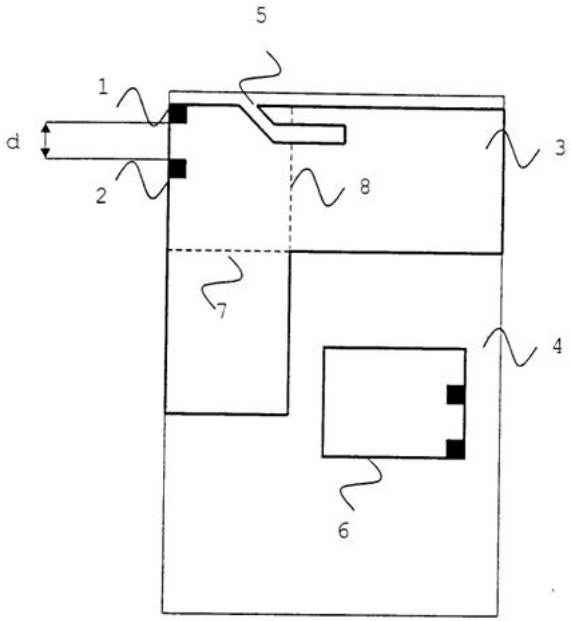
Fractus Exhibit 2003
Fractus v. Geotab
Page 183 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-25:

Fractus Exhibit 2003
Fractus v. Geotab
Page 184 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. The first planar antenna is as described above. The second planar antenna has a resonance frequency with sufficient bandwidth so that it is possible to utilize in Bluetooth applications. The second planer antenna utilizes the same ground element as the first planar antenna. It can utilize the same transceiver unit as the first planar antenna or a separate transceiver unit whichever is preferred. It is due to the unique shape of the first planar antenna that it is possible to provide the second planar antenna for Bluetooth applications and still get a compact antenna. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 185 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 2
14[d]	a first antenna configured to transmit and receive electromagnetic waves	*See* above re claim element 1[d] which is incorporated by reference herein.

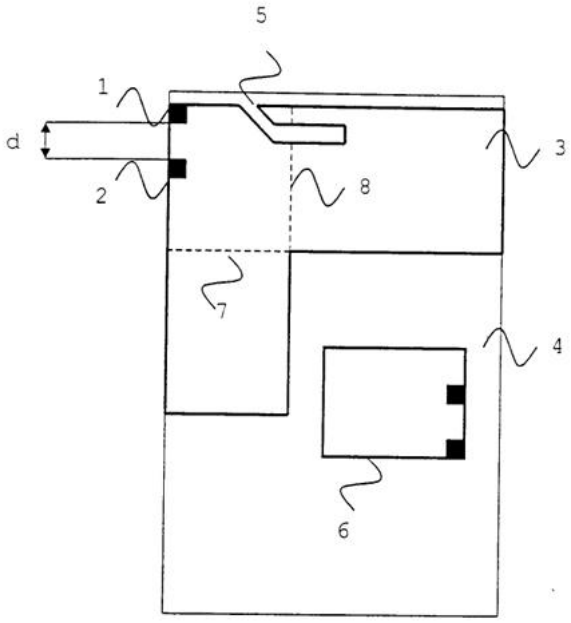
Fractus Exhibit 2003
Fractus v. Geotab
Page 186 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	corresponding to at least two frequency bands;	
14[e]	the at least two frequency bands being used for mobile communication services;	*See* above re claim element 1[e] which is incorporated by reference herein.
14[f]	a second antenna configured to operate in at least one frequency band;	*See* above re claim element 1[f] which is incorporated by reference herein.
14[g]	the at least one frequency band being different from the at least two frequency bands;	*See* above re claim element 1[g] which is incorporated by reference herein.
14[h]	the first antenna extends in a direction substantially parallel to the first side;	*See* above re claim element 1[h] which is incorporated by reference herein.
14[i]	the first antenna is proximate to the first side;	*See* above re claim element 1[j] which is incorporated by reference herein.
14[j]	the second antenna extends in a direction substantially parallel to the third side;	*See* above re claim element 1[i] which is incorporated by reference herein. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

Fractus Exhibit 2003
Fractus v. Geotab
Page 187 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

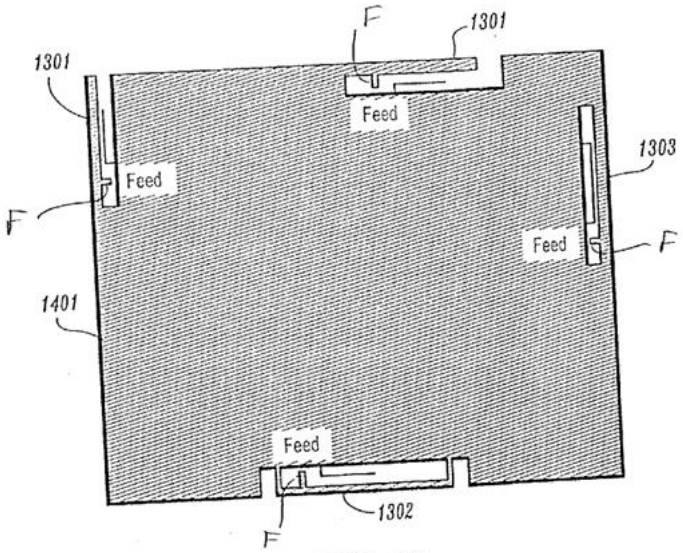
Fractus Exhibit 2003
Fractus v. Geotab
Page 188 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 2 *See also*: Flint at [0056]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 189 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

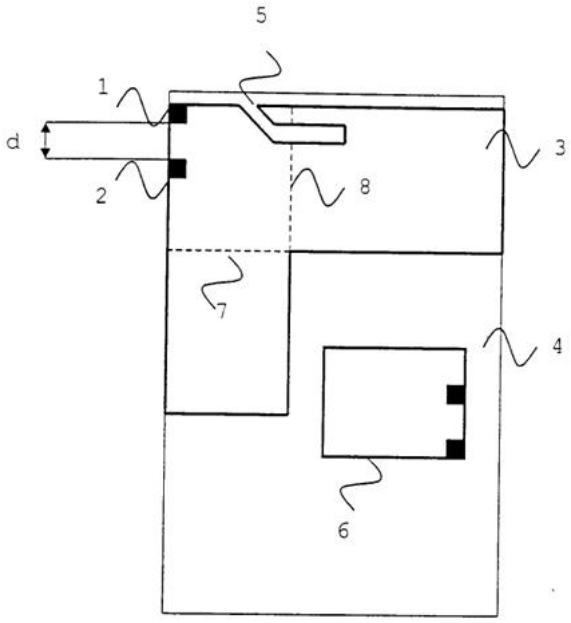
Fractus Exhibit 2003
Fractus v. Geotab
Page 190 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 14
14[k]	the second antenna is proximate to the third side;	*See* above re claim 2 which is incorporated by reference herein. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 191 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

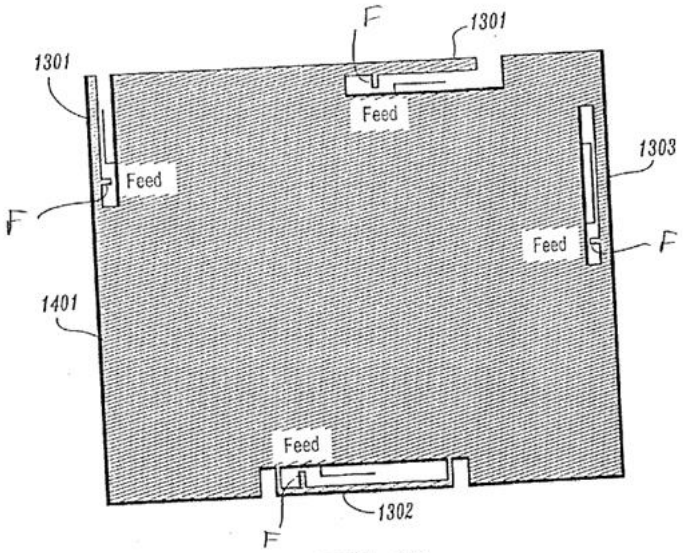
Fractus Exhibit 2003
Fractus v. Geotab
Page 192 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 2 *See also*: Flint at [0056]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 193 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

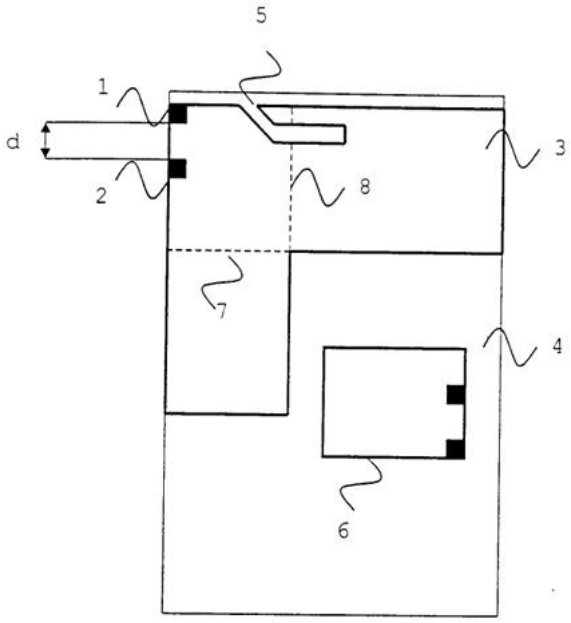
Fractus Exhibit 2003
Fractus v. Geotab
Page 194 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 14
14[l]	the second antenna is inscribed in a second rectangular area;	It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where

Fractus Exhibit 2003
Fractus v. Geotab
Page 195 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

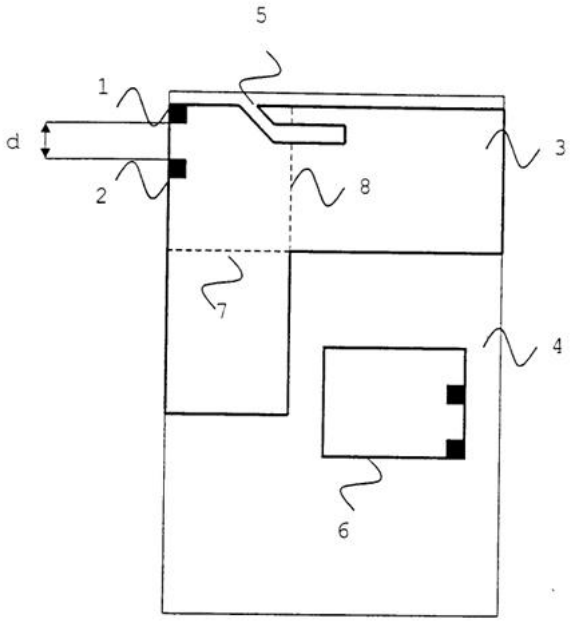
Fractus Exhibit 2003
Fractus v. Geotab
Page 196 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 2
14[m]	a sum of a length and a width of the second rectangular area is smaller than a quarter of an	It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

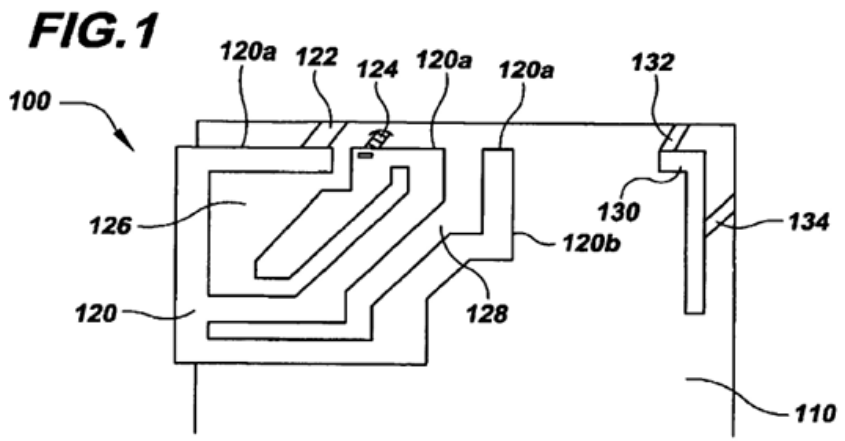
Fractus Exhibit 2003
Fractus v. Geotab
Page 197 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	operating wavelength of the second antenna;	*See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu at 6:26-30: > The first frequency band mentioned above is about 824-960 MHz (AMPS and GSM 900), said second frequency band is about 1710-1880 MHz (DCS 1800) or 1880-1990 MHz (PCS 1900), and said third frequency band is about 2400-2500 MHz (Bluetooth). A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 198 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 2
14[n]	a geometry of the first antenna being different than a geometry of the second antenna;	Talvitie expressly or inherently discloses this claim element. *See, e.g.*,

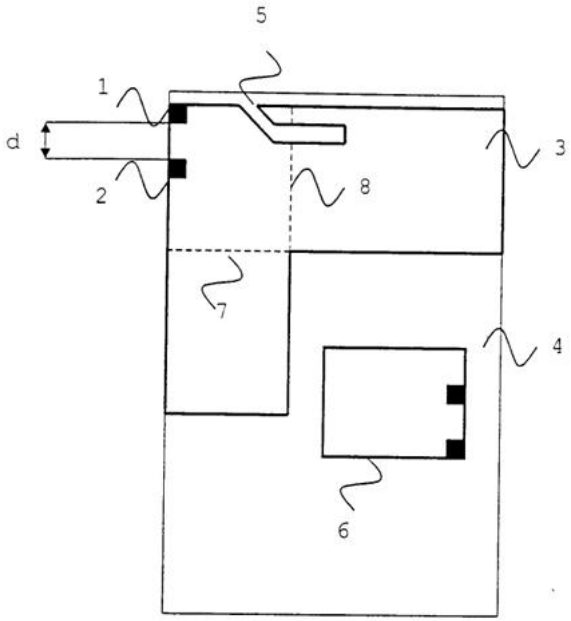
Fractus Exhibit 2003
Fractus v. Geotab
Page 199 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		Talvitie FIG. 1:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Hu at 6:6-15:

Fractus Exhibit 2003
Fractus v. Geotab
Page 200 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 201 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
		 FIG. 2
14[o]	at least one of the first antenna and the second antenna is proximate to a corner of the first rectangular area; and	*See* above re claims 3, 4 which are incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 202 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
14[p]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	*See* above re claim element 1[k] which is incorporated by reference herein.
Claim 15		
15[pre]	The wireless handheld or portable device according to claim 14,	*See* above re claim 14 which is incorporated by reference herein.
15[a]	wherein the first antenna is proximate to a first corner of the first rectangular area and	*See* above re claim 4 which is incorporated by reference herein.
15[b]	the second antenna is proximate to a second corner of the first rectangular area.	*See* above re claim 3 which is incorporated by reference herein.
Claim 17		
17	The wireless handheld or portable device according to claim 14, wherein the at least one frequency band is used for a wireless connectivity service selected from the group comprising: Bluetooth™,	*See* above re claim 7 which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 203 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Talvitie
	IEEE802.11a, IEEE802.11b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	

Fractus Exhibit 2003
Fractus v. Geotab
Page 204 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON INTERNATIONAL PCT APPLICATION PUBLICATION NO. WO 01/65636 A1 TO HU ("HU")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of the asserted claims. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1], particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

International PCT Application Publication No. WO 01/65636 A1 to Hu ("Hu") was filed on February 20, 2001, published on September 7, 2001, and claims priority to March 2, 2000. This publication is prior art under at least 35 U.S.C. § 102(e) and 103(a). As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Hu.

To the extent that Hu is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Hu alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Application Publication No. 2003/0124982 to Saari et al. ("Saari") was filed on October 31, 2002, published on July 3, 2003, and claims priority to October 31, 2001. This patent is prior art under at least 35 U.S.C. § 102(e), and 103(a).
- U.S. Patent No. 6,388,626 to Gamalielsson et al. ("Gamalielsson") was filed on May 14, 1998, issued on May 14, 2002, and claims priority to July 9, 1997. This patent is prior art under at least 35 U.S.C. § 102(a), and 103(a).
- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato") was filed on June 12, 2002, published on March 4, 2004, and claims priority to June 12, 2001. This patent is prior art under at least 35 U.S.C. § 102(e) and 103(a).
- U.S. Patent Application Publication No. 2003/0222823 to Flint et al ("Flint") was filed on February 20, 2003, published on December 4, 2003, and claims priority to U.S. Patent Application No. 09/866,974 filed on May 29, 2001. This publication is prior art under at least 35 U.S.C. § 102(e) and 103(a).

[1] Defendant understands that, by not charting claims 5-6, 10, 12-13, and 16, 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.

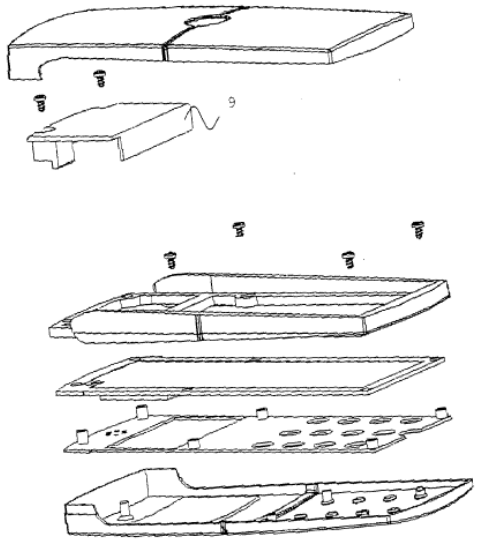
Fractus Exhibit 2003
Fractus v. Geotab
Page 205 of 563

These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants reserve the right to update their constructions and contentions in view of this Court's claim construction order.[2]

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
	Claim 1	
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 1:6-10: > The present invention relates generally to an internal planar antenna device in radio communication and more particularly to a wideband multiband internal planar antenna for a radio communication device such as a mobile telephone adapted for use with at least two frequency bands. Hu at 3:3-5: > Another object of the present invention is to provide an antenna device of the kind initially mentioned that is compact and internal in a mobile telephone. Hu FIG. 3:

[2] Defendants incorporate herein any related work performed by or on behalf of an author or an inventor in the United States under 35 U.S.C. § 102(g). Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

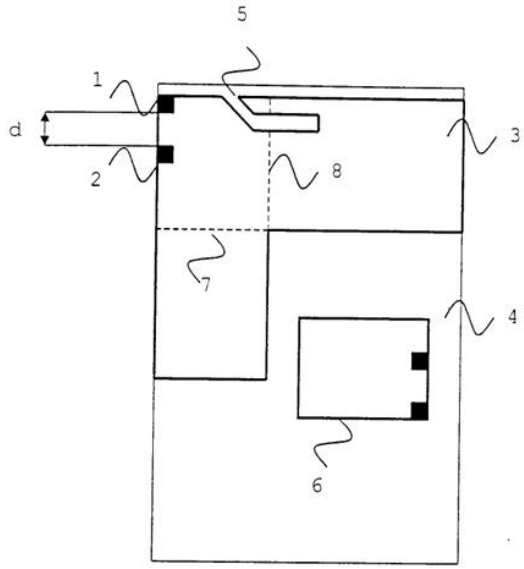
Fractus Exhibit 2003
Fractus v. Geotab
Page 206 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 3 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 207 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[a]	a ground plane;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 5:20-28: > A grounding element is connected, at a point 1, to the radiating element 3 at a corner of the common portion and is connectable to a ground element 4. The ground element 4 is in a plane different from a plane of the radiating element 3. A feeding element is connected, at a point 2, to the radiating element 3 at an of the first radiating portion, at a distanced of approximately 15 mm from the grounding element, and is connectable to a transceiver circuit (not shown). Hu FIG. 2:

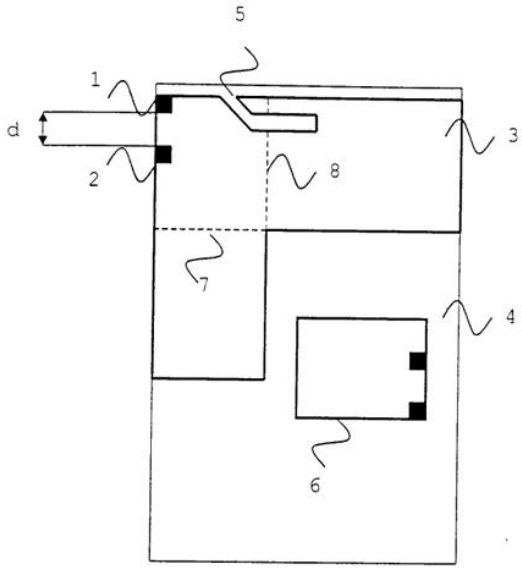
Fractus Exhibit 2003
Fractus v. Geotab
Page 208 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 209 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[b]	the ground plane is inscribed in a rectangular area comprising a first side and a second side,	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 5:20-28: > A grounding element is connected, at a point 1, to the radiating element 3 at a corner of the common portion and is connectable to a ground element 4. The ground element 4 is in a plane different from a plane of the radiating element 3. A feeding element is connected, at a point 2, to the radiating element 3 at an of the first radiating portion, at a distanced of approximately 15 mm from the grounding element, and is connectable to a transceiver circuit (not shown). Hu FIG. 2:

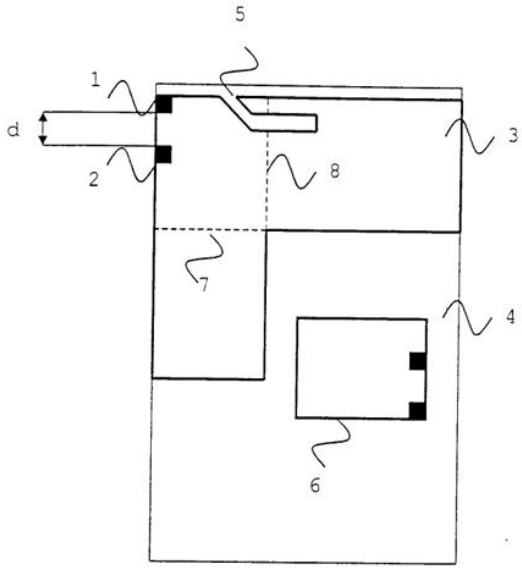
Fractus Exhibit 2003
Fractus v. Geotab
Page 210 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 211 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[c]	a length of the second side being greater than a length of the first side;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu FIG. 2:

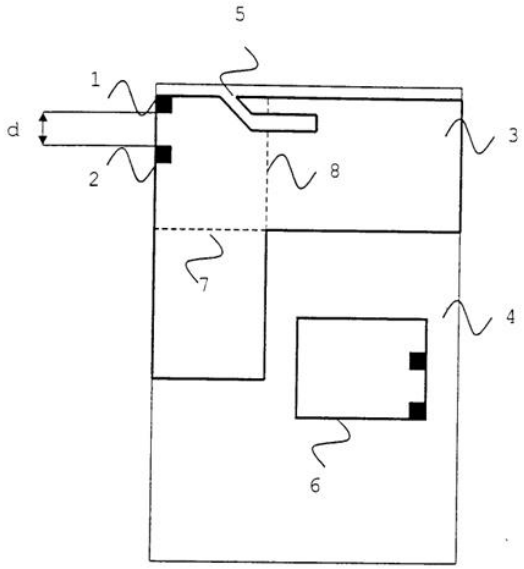
Fractus Exhibit 2003
Fractus v. Geotab
Page 212 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 213 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 5:1-10: > The antenna device comprises a single planar radiating element 3, having a first and a second portion, which are shaped like two orthogonal generally rectangular elements with a portion in common. This gives the antenna a general shape of the capital letter L. The first portion, generally enclosed by a dotted line 8 and extending vertically in the figure, resonates essentially in a first, lower frequency band, and the second portion, generally enclosed by a dotted line 7 and extending horizontally in the figure, resonates essentially in a second, higher frequency band. Hu at 6:6-16: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide IO wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. > The first planar antenna is as described above.

Fractus Exhibit 2003
Fractus v. Geotab
Page 214 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		Hu FIG. 2:  FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious.

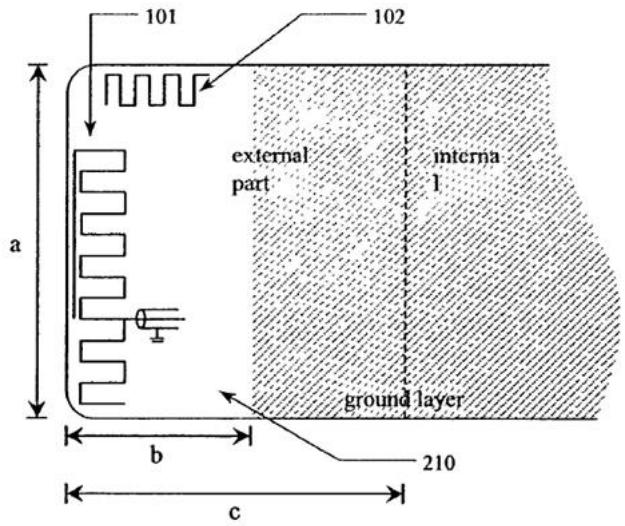
Fractus Exhibit 2003
Fractus v. Geotab
Page 215 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0106]: FIG. 6a shows one of the antennas of the antenna system of the present invention. The antenna shown is the main antenna used for E-GSM/DCS communication and WLAN/ISM communication. The feedpoint of the antenna is placed substantially in the middle of the antenna structure. The left and right side structure parts relating to the feed point are connected galvanically and parasitically to each other. According to the operation frequency the length of the left antenna structure side is adapted for WLAN operation on the ISM band, i.e., at a resonant frequency of 2.4 GHz. The right side of the antenna structure relating to the feed point of the antenna is prepared for operation on the E-GSM/DCS frequencies, i.e., on the E-GSM/GSM frequencies of 900 MHz and 1.8 GHz and on the DCS frequency of 1.9 GHz. The antenna structure itself consists of a normal meander line including a feedback line. The design of the E-GSM/DCS structure part of the main antenna is carried out according to dual or triple band antennas which are described in several patents such as EP 0 923 158 A2 or EP 0 938 158 A2. Saari at [0108]: FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and

Fractus Exhibit 2003
Fractus v. Geotab
Page 216 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 217 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 Fig. 6b
1[e]	the at least three frequency bands being used for mobile communication services;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 5:1-10: > The antenna device comprises a single planar radiating element 3, having a first and a second portion, which are shaped like two orthogonal generally rectangular elements with a portion in common. This gives the antenna a general shape of the capital letter L. The first portion, generally enclosed by a dotted line 8 and extending vertically in the figure,

Fractus Exhibit 2003
Fractus v. Geotab
Page 218 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		resonates essentially in a first, lower frequency band, and the second portion, generally enclosed by a dotted line 7 and extending horizontally in the figure, resonates essentially in a second, higher frequency band. Hu at 6:26-30: The first frequency band mentioned above is about 824-960 MHz (AMPS and GSM 900), said second frequency band is about 1710-1880 MHz (DCS 1800) or 1880-1990 MHz (PCS 1900), and said third frequency band is about 2400-2500 MHz (Bluetooth). To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0004]: Mobile communication techniques have brought and will bring to the marketplace new, versatile communication models in which new requirements are placed on multi frequency antenna assemblies not only operating in the mobile communication network according to the different radio frequencies of the Global System for Mobile communication (GSM) but also operating on other wireless communication standards and therefore other frequencies, for example wireless local area network (WLAN) according

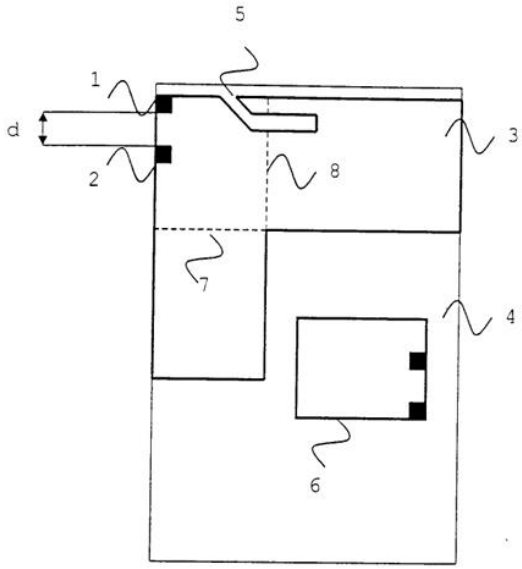
Fractus Exhibit 2003
Fractus v. Geotab
Page 219 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		to WLAN 802.11b standard. Both GSM and WLAN communication are used for wireless data communication, wherein so called enhanced GSM (E-GSM) standard has been mentioned comprising GSM packet radio system (GPRS), high speed circuit switched data HSCSD or further enhanced data rate for GSM evolution (EDGE). A related mobile communication system according to GSM has additionally to be taken into account which is called Global Digital System for mobile communication (DCS). Saari at [0106]: FIG. 6a shows one of the antennas of the antenna system of the present invention. The antenna shown is the main antenna used for E-GSM/DCS communication and WLAN/ISM communication. The feedpoint of the antenna is placed substantially in the middle of the antenna structure. The left and right side structure parts relating to the feed point are connected galvanically and parasitically to each other. According to the operation frequency the length of the left antenna structure side is adapted for WLAN operation on the ISM band, i.e., at a resonant frequency of 2.4 GHz. The right side of the antenna structure relating to the feed point of the antenna is prepared for operation on the E-GSM/DCS frequencies, i.e., on the E-GSM/GSM frequencies of 900 MHz and 1.8 GHz and on the DCS frequency of 1.9 GHz. The antenna structure itself consists of a normal meander line including a feedback line. The design of the E-GSM/DCS structure part of the main antenna is carried out according to dual or triple band antennas which are described in several patents such as EP 0 923 158 A2 or EP 0 938 158 A2.
1[f]	a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 6:6-25:

Fractus Exhibit 2003
Fractus v. Geotab
Page 220 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide IO wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. The first planar antenna is as described above. The second planar antenna has a resonance frequency with sufficient bandwidth so that it is possible to utilize in Bluetooth applications. The second planer antenna utilizes the same ground element as the first planar antenna. It can utilize the same transceiver unit as the first planar antenna or a separate transceiver unit whichever is preferred. It is due to the unique shape of the first planar antenna that it is possible to provide the second planar antenna for Bluetooth applications and still get a compact antenna. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 221 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

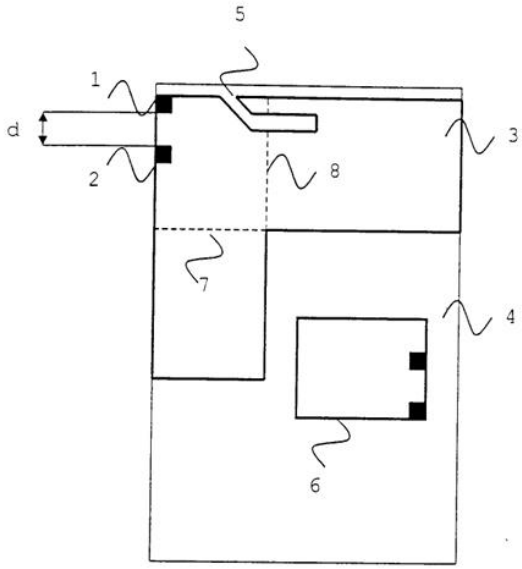
Fractus Exhibit 2003
Fractus v. Geotab
Page 222 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[g]	the at least one frequency band being used for wireless connectivity services;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 6:6-30: In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide IO wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. The first planar antenna is as described above. The second planar antenna has a resonance frequency with sufficient bandwidth so that it is possible to utilize in Bluetooth applications. The second planer antenna utilizes the same ground element as the first planar antenna. It can utilize the same transceiver unit as the first planar antenna or a separate transceiver unit whichever is preferred. It is due to the unique shape of the first planar antenna that it is possible to provide the second planar antenna for Bluetooth applications and still get a compact antenna. The first frequency band mentioned above is about 824-960 MHz (AMPS and GSM 900), said second frequency band is about 1710-1880 MHz (DCS 1800) or 1880-1990 MHz (PCS 1900), and said third frequency band is about 2400-2500 MHz (Bluetooth).

Fractus Exhibit 2003
Fractus v. Geotab
Page 223 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[h]	the first antenna extends in a direction substantially parallel to the first side;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu FIG. 2:

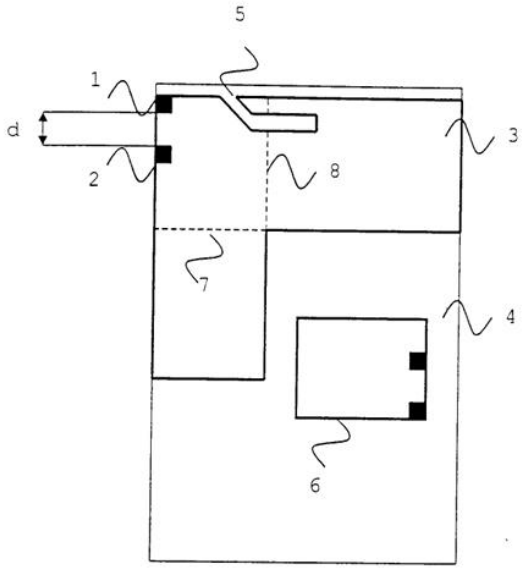
Fractus Exhibit 2003
Fractus v. Geotab
Page 224 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 225 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[i]	the second antenna extends in a direction substantially parallel to the second side;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu FIG. 2:

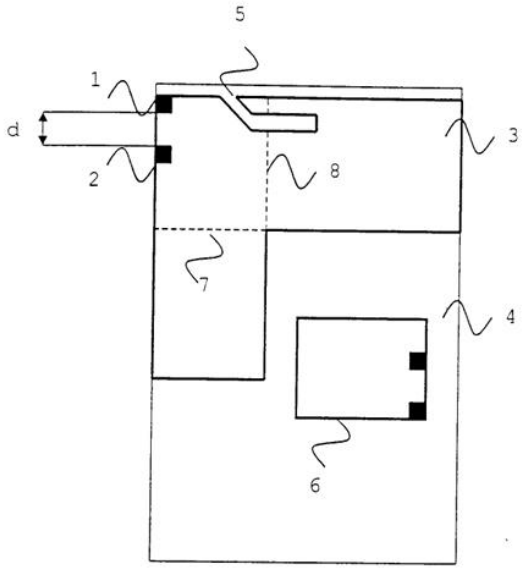
Fractus Exhibit 2003
Fractus v. Geotab
Page 226 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[j]	the first antenna is arranged substantially close to the first side; and	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 5:20-28: > A grounding element is connected, at a point 1, to the radiating element 3 at a corner of the common portion and is connectable to a ground element 4. The ground element 4 is in a plane different from a plane of the radiating element 3. A feeding element is connected, at a point 2, to the radiating element 3 at an of the first radiating portion, at a distanced of approximately 15 mm from the grounding element, and is connectable to a transceiver circuit (not shown). Hu FIG. 2:

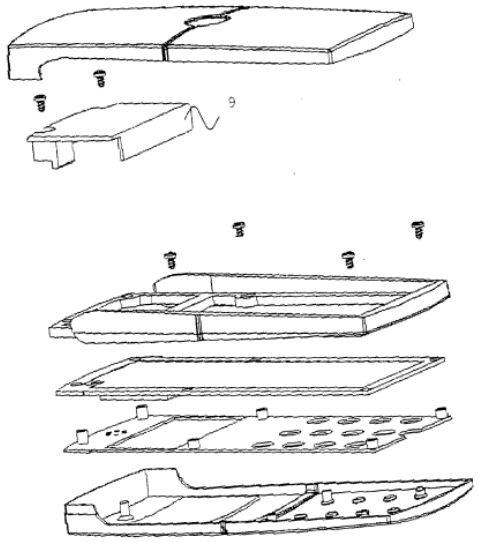
Fractus Exhibit 2003
Fractus v. Geotab
Page 228 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 229 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at Title ("A Wideband Multiband ***Internal*** Antenna Device and a Portable Radio Communication Device Comprising Such an Antenna Device"). Hu at 1:6-10: > The present invention relates generally to an internal planar antenna device in radio communication and more particularly to a wideband multiband internal planar antenna for a radio communication device such as a mobile telephone adapted for use with at least two frequency bands. Hu at 3:3-5: > Another object of the present invention is to provide an antenna device of the kind initially mentioned that is compact and internal in a mobile telephone. Hu FIG. 3:

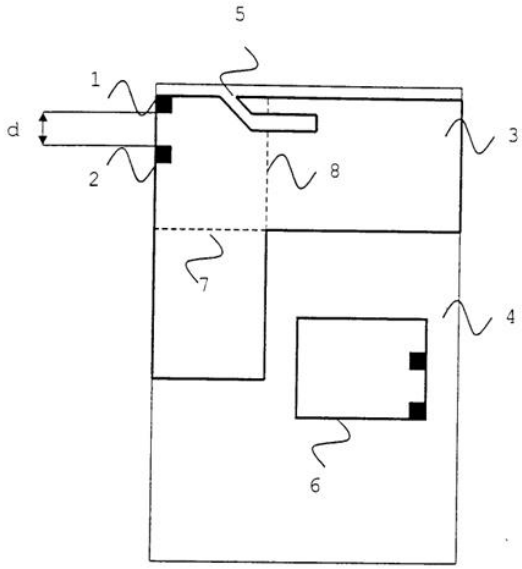
Fractus Exhibit 2003
Fractus v. Geotab
Page 230 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 3 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 231 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
Claim 2		
2	The wireless handheld or portable device according to claim 1, wherein the second antenna is arranged substantially close to the second side.	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu FIG. 2:

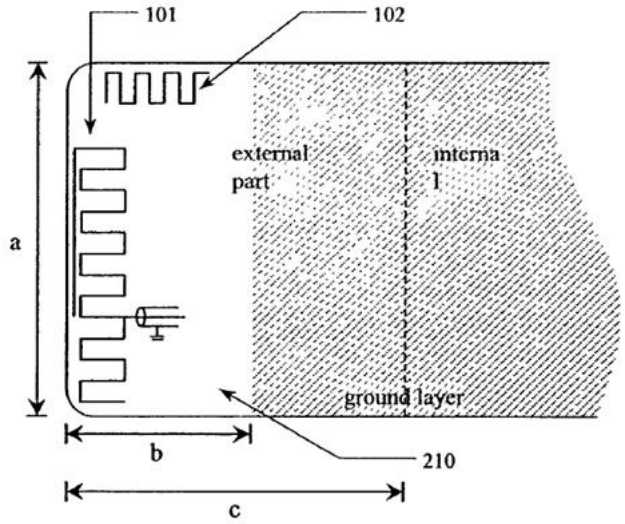
Fractus Exhibit 2003
Fractus v. Geotab
Page 232 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

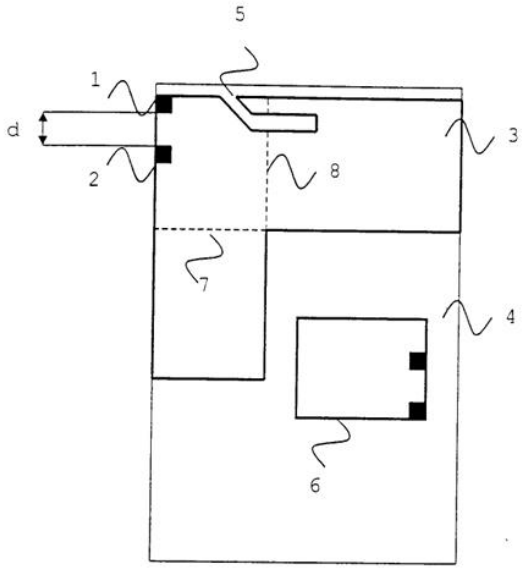
Fractus Exhibit 2003
Fractus v. Geotab
Page 233 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 234 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 Fig. 6b
Claim 3		
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially close to a corner of the rectangular area.	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu FIG. 2:

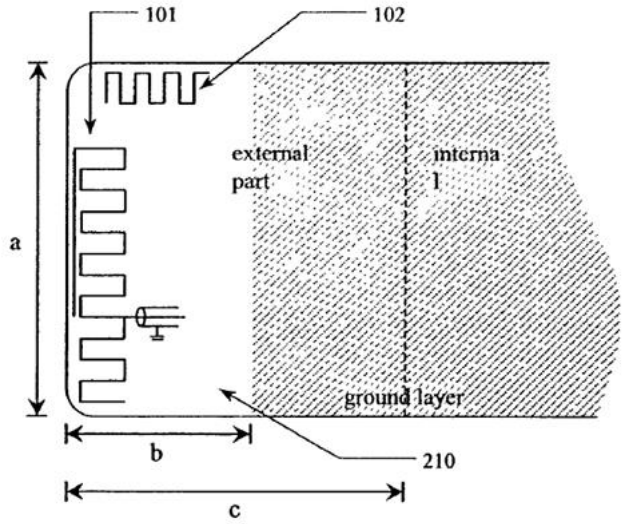
Fractus Exhibit 2003
Fractus v. Geotab
Page 235 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

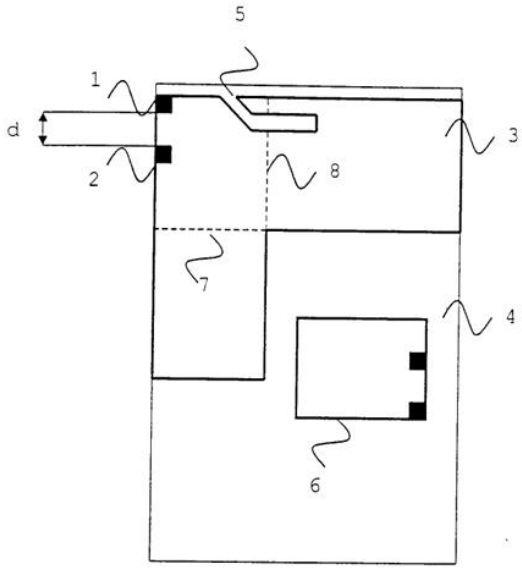
Fractus Exhibit 2003
Fractus v. Geotab
Page 236 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 237 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 Fig. 6b
Claim 4		
4	The wireless handheld or portable device according to claim 1, wherein the first antenna is arranged substantially close to a corner of the rectangular area.	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu FIG. 2:

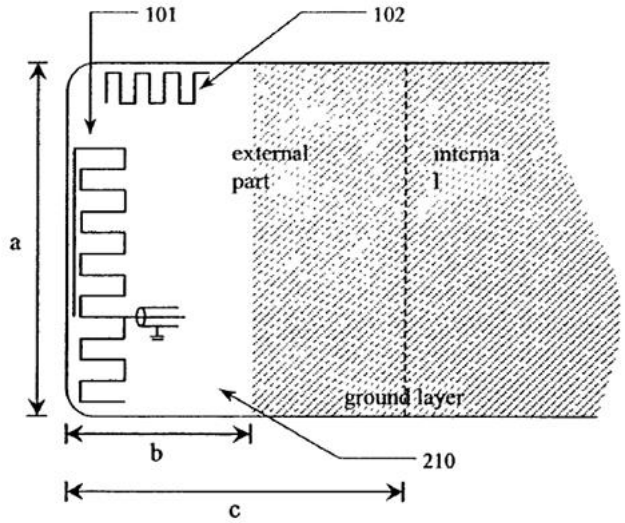
Fractus Exhibit 2003
Fractus v. Geotab
Page 238 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 239 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Saari at [0108]: > FIG. 6b shows the arrangement of the antenna structure on a printed wired board (PWB) 210, sometimes called a printed circuit board (PCB). The main (first) antenna 101 described in FIG. 2 is placed vertically near the left edge of the PWB 210 so that the WLAN/ISM antenna part is placed near the left lower corner. The second antenna 102 for diversity operation of the WLAN/ISM communication is placed near the upper edge and near the left upper corner. This arrangement of the antennas for diversity operation ensures sufficient distance thereof. Both antennas are placed on the same side of the PWB 210. Advantageously, by placing the antennas near the edges and corners of the PWB 210 it is possible to employ FR4 substrate, a cheap and easy available substrate material with excellent mechanical properties used for manufacturing PWBs although it is not used conventionally for PWBs systems operating at microwave frequencies due to high losses at these frequencies. For high density microwave circuits where path lengths are short and for broadband antenna elements, where losses and absolute dielectric constant values are less critical, the material could be used instead of more conventional substrate material, offering significant cost saving. Saari FIG. 6b:

Fractus Exhibit 2003
Fractus v. Geotab
Page 240 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 Fig. 6b
Claim 7		
7	The wireless handheld or portable device according to claim 1, wherein the at least one frequency band used for wireless connectivity services corresponds to at least one wireless connectivity service	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 6:6-30: In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where

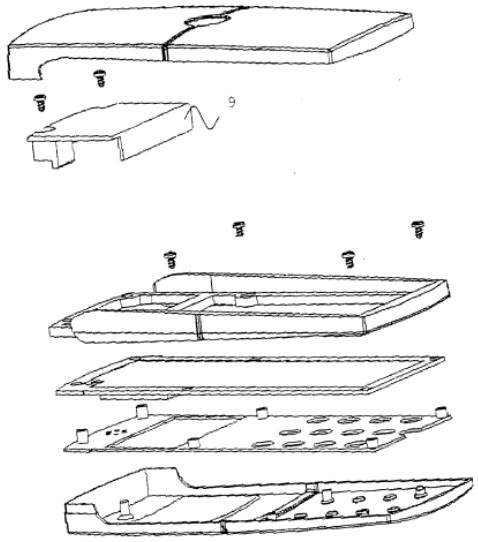
Fractus Exhibit 2003
Fractus v. Geotab
Page 241 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
	selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	two (a first and a second) planar antennae are utilized to provide IO wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. The first planar antenna is as described above. The second planar antenna has a resonance frequency with sufficient bandwidth so that it is possible to utilize in Bluetooth applications. The second planer antenna utilizes the same ground element as the first planar antenna. It can utilize the same transceiver unit as the first planar antenna or a separate transceiver unit whichever is preferred. It is due to the unique shape of the first planar antenna that it is possible to provide the second planar antenna for Bluetooth applications and still get a compact antenna. The first frequency band mentioned above is about 824-960 MHz (AMPS and GSM 900), said second frequency band is about 1710-1880 MHz (DCS 1800) or 1880-1990 MHz (PCS 1900), and said third frequency band is about 2400-2500 MHz (Bluetooth). To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
Claim 8		

Fractus Exhibit 2003
Fractus v. Geotab
Page 242 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
8[pre]	A portable device comprising:	*See* above re claim element 1[pre] which is incorporated by reference herein.
8[a]	a ground plane;	*See* above re claim element 1[a] which is incorporated by reference herein.
8[b]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	*See* above re claim element 1[d] which is incorporated by reference herein.
8[c]	the at least three frequency bands being used for mobile communication services;	*See* above re claim element 1[e] which is incorporated by reference herein.
8[d]	a second antenna configured to operate in at least one frequency band;	*See* above re claim element 1[f] which is incorporated by reference herein.
8[e]	the first antenna extends in a direction substantially parallel to a first side of the portable device;	*See* above re claim element 1[h] which is incorporated by reference herein. *See also, e.g.*,: Hu at 7:1-5:

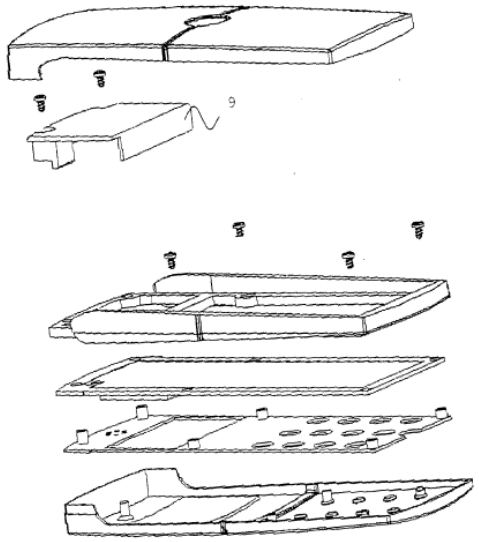
Fractus Exhibit 2003
Fractus v. Geotab
Page 243 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 3:  FIG. 3 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

Fractus Exhibit 2003
Fractus v. Geotab
Page 244 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	*See* above re claim element 1[c] which is incorporated by reference herein. *See also, e.g.*,: Hu at 7:1-5: > A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 3:

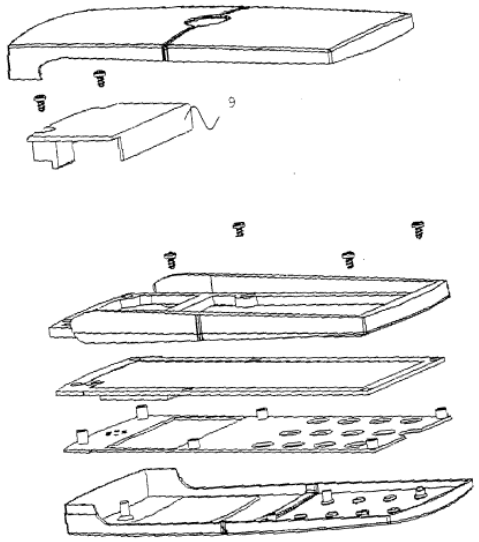
Fractus Exhibit 2003
Fractus v. Geotab
Page 245 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 3 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 246 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	*See* above re claim element 1[j] which is incorporated by reference herein. *See also, e.g.*,: Hu at 7:1-5: A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 3:

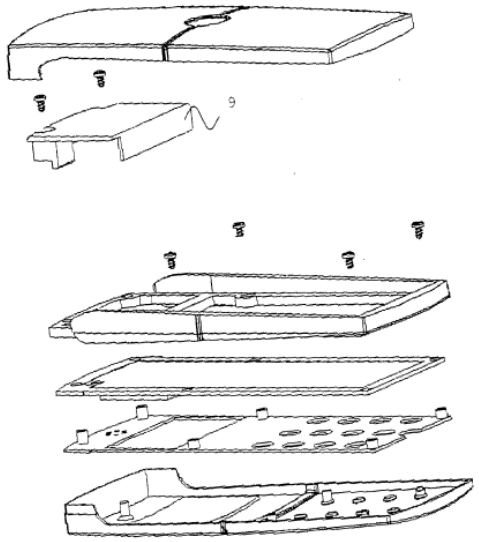
Fractus Exhibit 2003
Fractus v. Geotab
Page 247 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 3 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 248 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	*See* above re claim 3 which is incorporated by reference herein. *See also, e.g.*,: Hu at 7:1-5: > A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 3:

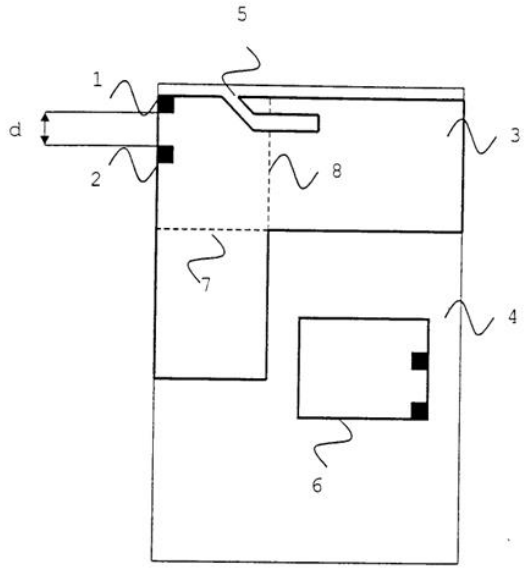
Fractus Exhibit 2003
Fractus v. Geotab
Page 249 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 3 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

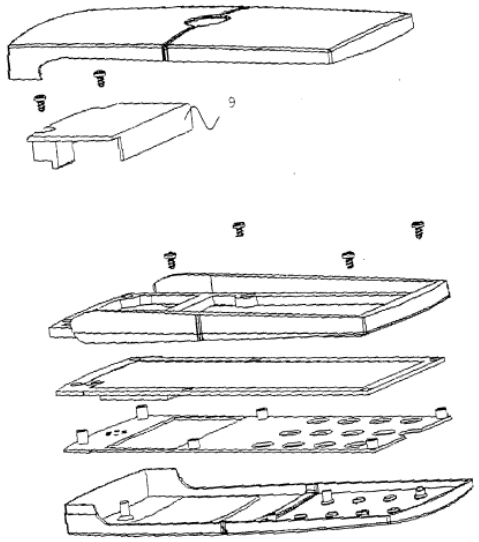
Fractus Exhibit 2003
Fractus v. Geotab
Page 250 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 7:1-5: > A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 251 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 Hu FIG. 3:

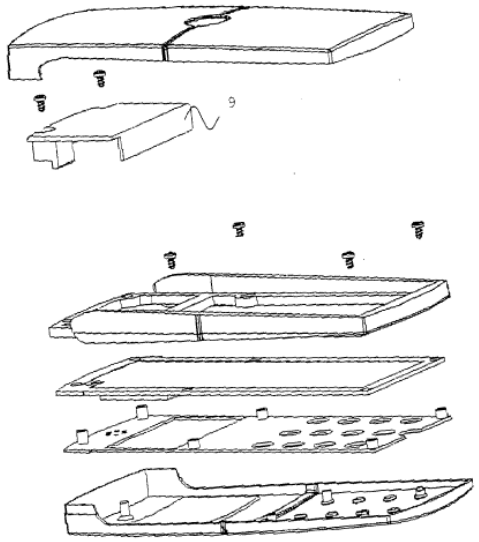
Fractus Exhibit 2003
Fractus v. Geotab
Page 252 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 3 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 253 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
8[j]	the first antenna and the second antenna are located internally within the portable device.	*See* above re claim element 1[k] which is incorporated by reference herein.
Claim 9		
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 7:1-5: > A portable radio communication device will be described with reference to Fig. 3. The portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 3:

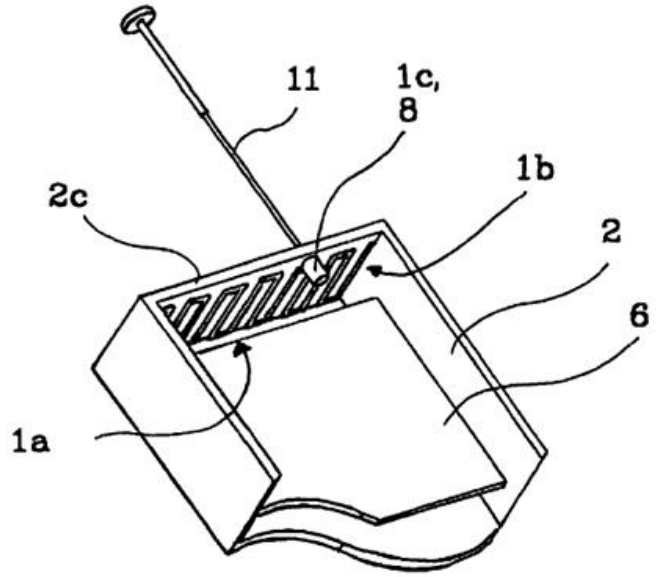
Fractus Exhibit 2003
Fractus v. Geotab
Page 254 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 3 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

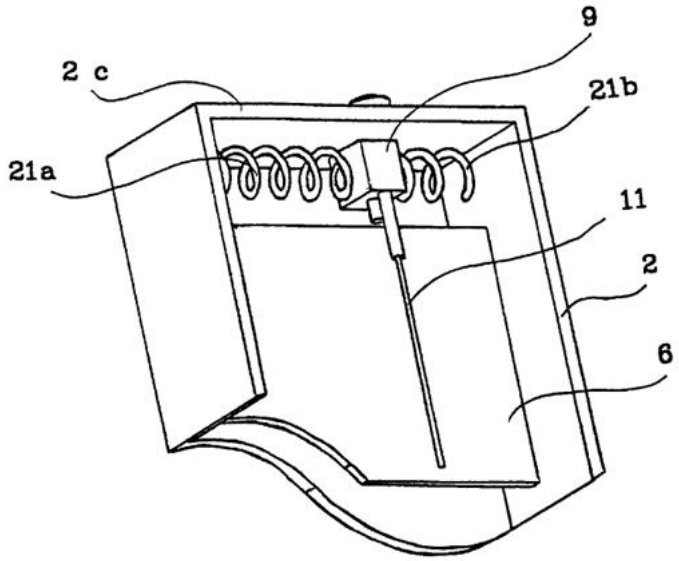
Fractus Exhibit 2003
Fractus v. Geotab
Page 255 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Gamalielsson at 4:49-67: In a third embodiment shown in FIG. 7, two meander configured radiating elements 1a and 1b are mounted onto the upper, shorter end wall 2c of the casing 2. The elements 1a, 1b can be mounted either directly onto the inside of the casing wall 2c, serving as a support means, by means of a printed circuit board or by the intermediary of a plastic foil similar to the one shown in FIG. 12, preferably with only one, two or three flap portions. In this case as well, the first and second radiating elements 1a, 1b have a meander-like pattern with multiple turns along a respective longitudinal axis from a common feed point: 1c. The elements 1a, 1b extends with their respective longitudinal axes in parallel to the shorter edge of the rectangular ground plane means 6, with which the radiating elements cooperate. In this embodiment as well, a retractable antenna rod 11 can be mounted in a guiding sleeve 8 at the common feed point 1c. As appears from FIG. 7, in this third embodiment, the meander elements 1a, and 1b are located in a plane which is perpendicular to the ground plane means 6. Gamalielsson at 5:23-30: In a fifth embodiment shown in FIG. 9, there are also two helical radiating elements 21a and 21b supported by a holding box 9, the difference from FIG. 8 being that the ground plane means 6 is not extended all the way to the end wall 2c of the casing. So, the longitudinal axes of the helical elements 21a 21b are located substantially in the same

Fractus Exhibit 2003
Fractus v. Geotab
Page 256 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		plane as the ground plane means 6. There is also a rod antenna 11, shown in its retracted position. Gamalielsson FIG. 7:  Gamalielsson FIG. 9:

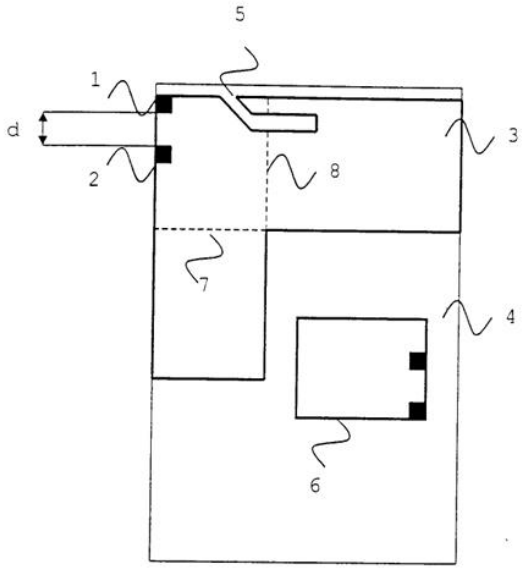
Fractus Exhibit 2003
Fractus v. Geotab
Page 257 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 Fig. 9
Claim 11		
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different	It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 258 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
	from the at least three frequency bands.	Sato at [0040] – [0041]: The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch.
Claim 14		
14[pre]	A wireless handheld or portable device comprising:	*See* above re claim element 1[pre] which is incorporated by reference herein.
14[a]	a ground plane;	*See* above re claim element 1[a] which is incorporated by reference herein.
14[b]	the ground plane is inscribed in a first rectangular area comprising a first side, a second side and a third side,	*See* above re claim element 1[b] which is incorporated by reference herein. *See also, e.g.*,: Hu FIG. 2:

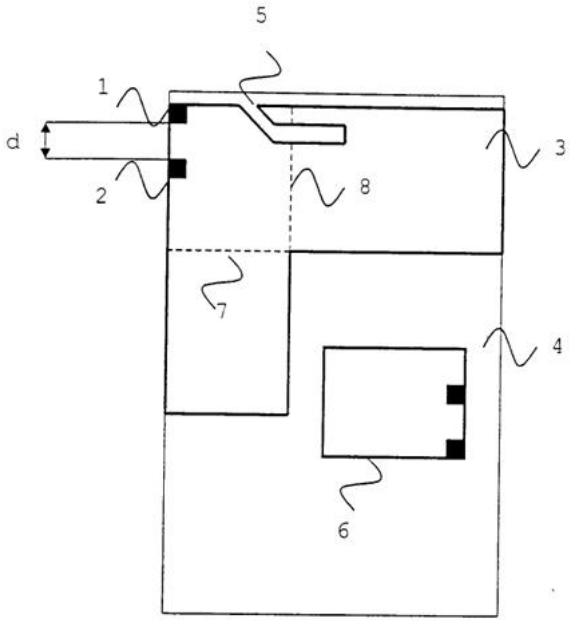
Fractus Exhibit 2003
Fractus v. Geotab
Page 259 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

Fractus Exhibit 2003
Fractus v. Geotab
Page 260 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
14[c]	a length of the second side being greater than a length of the first side and a length of the third side;	*See* above re claim element 1[c] which is incorporated by reference herein. *See also, e.g.*,: Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 261 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious.

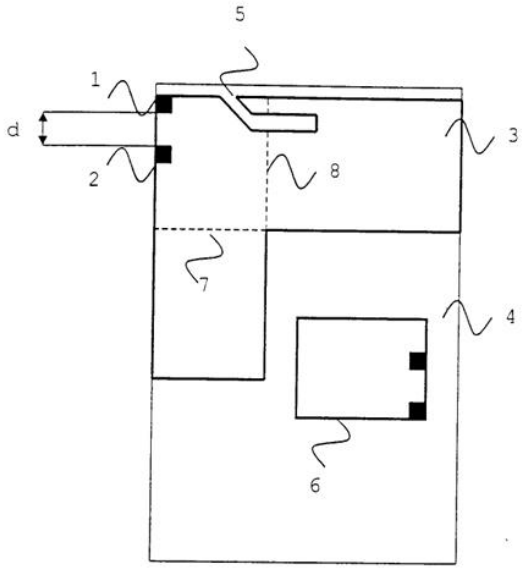
Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
14[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least two frequency bands;	*See* above re claim element 1[d] which is incorporated by reference herein.
14[e]	the at least two frequency bands being used for mobile communication services;	*See* above re claim element 1[e] which is incorporated by reference herein.
14[f]	a second antenna configured to operate in at least one frequency band;	*See* above re claim element 1[f] which is incorporated by reference herein.
14[g]	the at least one frequency band being different from the at least two frequency bands;	*See* above re claim element 1[g] which is incorporated by reference herein.
14[h]	the first antenna extends in a direction substantially parallel to the first side;	*See* above re claim element 1[h] which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 263 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
14[i]	the first antenna is proximate to the first side;	*See* above re claim element 1[j] which is incorporated by reference herein.
14[j]	the second antenna extends in a direction substantially parallel to the third side;	*See* above re claim element 1[i] which is incorporated by reference herein. *See also, e.g.*,: Hu FIG. 2:

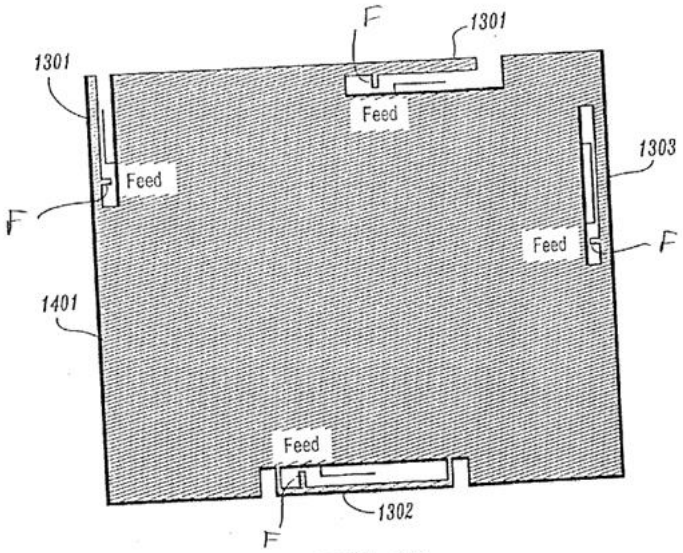
Fractus Exhibit 2003
Fractus v. Geotab
Page 264 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

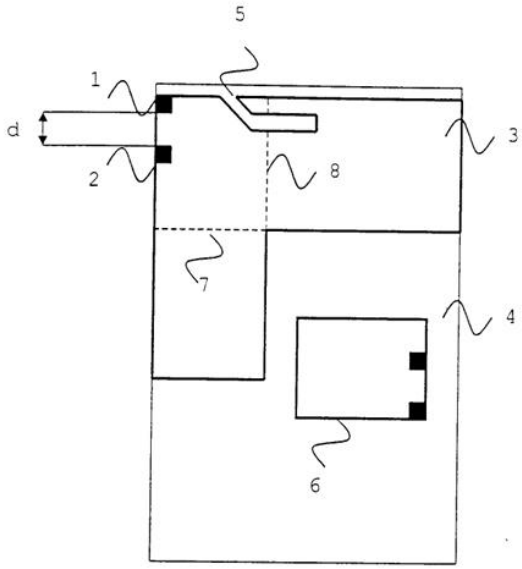
Fractus Exhibit 2003
Fractus v. Geotab
Page 265 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Flint at [0056]: > By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

Fractus Exhibit 2003
Fractus v. Geotab
Page 266 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 14
14[k]	the second antenna is proximate to the third side;	*See* above re claim 2 which is incorporated by reference herein. *See also, e.g.*,: Hu FIG. 2:

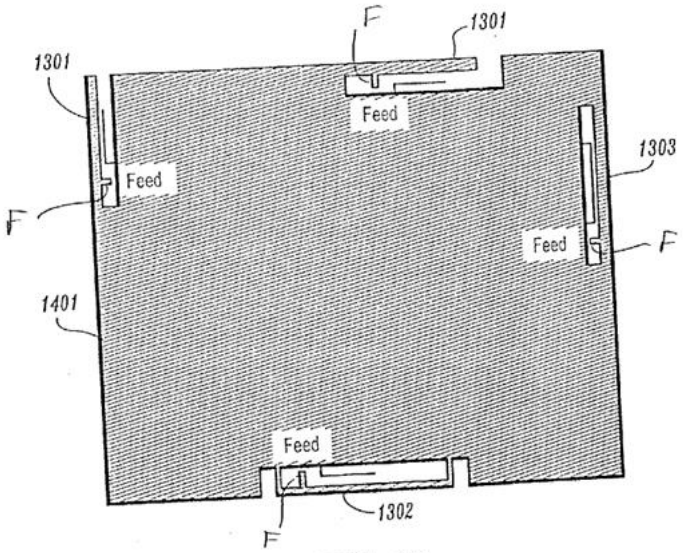
Fractus Exhibit 2003
Fractus v. Geotab
Page 267 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

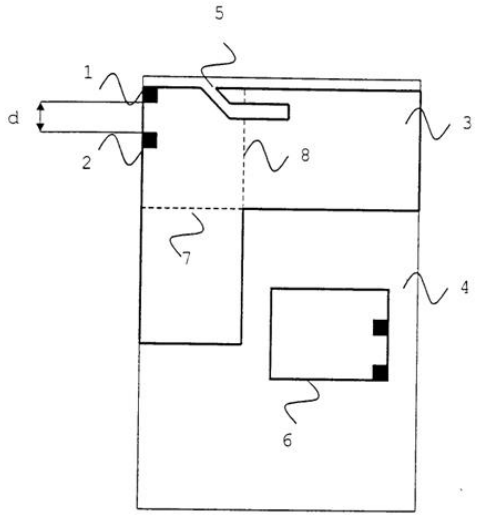
Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Flint at [0056]: > By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

Fractus Exhibit 2003
Fractus v. Geotab
Page 269 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 14
14[l]	the second antenna is inscribed in a second rectangular area;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The

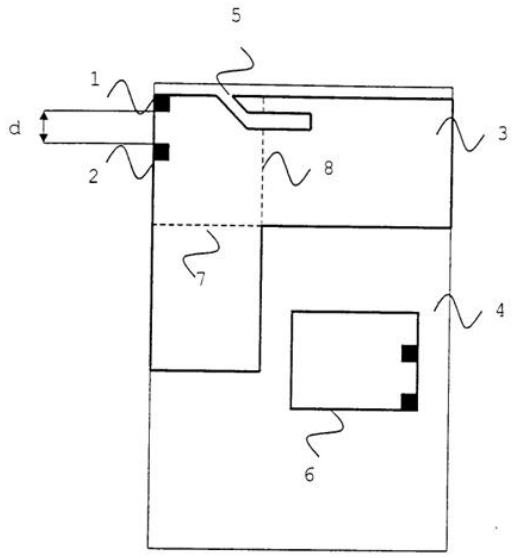
Fractus Exhibit 2003
Fractus v. Geotab
Page 270 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:  FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
14[m]	a sum of a length and a width of the second rectangular area is smaller than a quarter of an operating wavelength of the second antenna;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu at 6:26-30: > The first frequency band mentioned above is about 824-960 MHz (AMPS and GSM 900), said second frequency band is about 1710-1880 MHz (DCS 1800) or 1880-1990 MHz (PCS 1900), and said third frequency band is about 2400-2500 MHz (Bluetooth). A portable radio communication device will be described with reference to Fig. 3. The

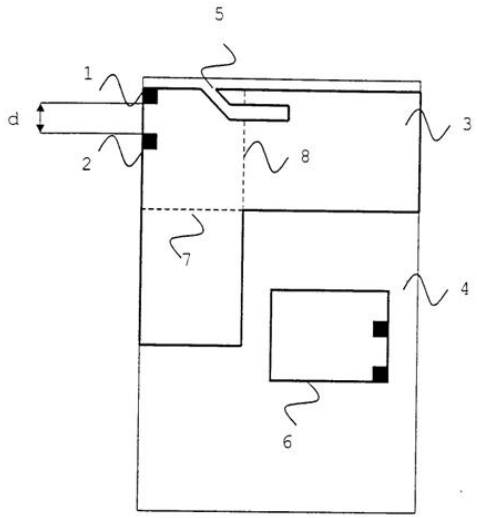
Fractus Exhibit 2003
Fractus v. Geotab
Page 272 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		portable radio communication device has a housing that encapsulates an antenna 9, wherein the antenna can be any of previously mentioned antenna devices. Hu FIG. 2:  FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

Fractus Exhibit 2003
Fractus v. Geotab
Page 273 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
14[n]	a geometry of the first antenna being different than a geometry of the second antenna;	Hu expressly or inherently discloses this claim element. *See, e.g.*, Hu at 6:6-15: > In order to describe an alternative embodiment according to the present invention reference is made to Fig. 2. An antenna device for a mobile telephone is shown, where two (a first and a second) planar antennae are utilized to provide wideband multiband frequency coverage. The first planar antenna has a radiating element 3 with, dual band coverage, where a lower frequency band and a middle frequency band are provided. The second planar antenna has a radiating element 6 with single band coverage, where a higher frequency band is provided. Hu FIG. 2:

Fractus Exhibit 2003
Fractus v. Geotab
Page 274 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 2 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions

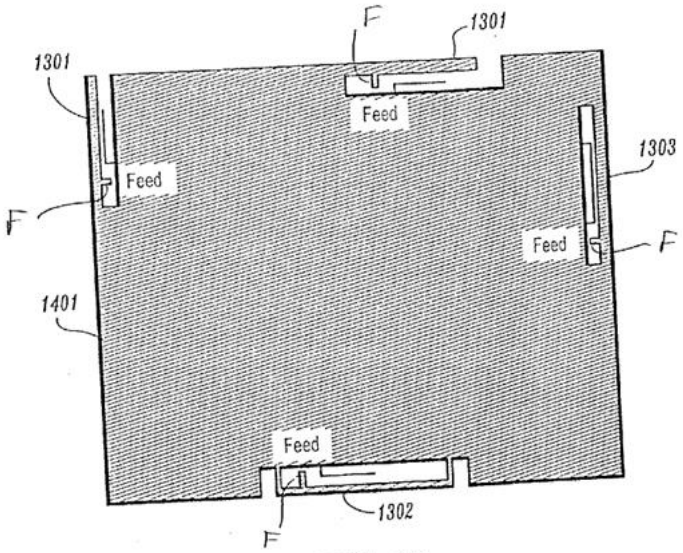
Fractus Exhibit 2003
Fractus v. Geotab
Page 275 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
14[o]	at least one of the first antenna and the second antenna is proximate to a corner of the first rectangular area; and	*See* above re claims 3, 4 which are incorporated by reference herein.
14[p]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	*See* above re claim element 1[k] which is incorporated by reference herein.
Claim 15		
15[pre]	The wireless handheld or portable device according to claim 14,	*See* above re claim 14 which is incorporated by reference herein.
15[a]	wherein the first antenna is proximate to a first corner of the first rectangular area and	*See* above re claim 4 which is incorporated by reference herein.
15[b]	the second antenna is proximate to a second corner of the first rectangular area.	*See* above re claim 3 which is incorporated by reference herein. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused

Fractus Exhibit 2003
Fractus v. Geotab
Page 276 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. *See, e.g.*, Flint at [0056]: > By way of example, FIG. 14 is illustrates embodiments of the antennas (1301, 1302, and 1303) of FIG. 13 which are built on an RF shielding foil (1401) on the back of a display. The feed portion F of the antennas can be connected to the inner conductor of a coaxial cable and the outer conductor (ground/shield) of the coaxial cable is connected to the RF foil opposite to the feed portion F. To ensure that antennas built from the RF shielding foil have desirable efficiency, the RF shielding foil preferably comprises a conductor material such as aluminum, copper, brass or gold, or other materials that provide good conductivity. It is to be understood that although not specifically shown in FIG. 14, the dual-band antenna (1304) depicted in FIG. 22(c) can be formed on RF foil using the same patterns illustrated in FIG. 14 for the various antenna elements. Flint FIG. 14:

Fractus Exhibit 2003
Fractus v. Geotab
Page 277 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
		 FIG. 14
Claim 17		
17	The wireless handheld or portable device according to claim 14, wherein the at least one frequency band is used for a wireless connectivity service selected from the group comprising: Bluetooth™, IEEE802.11a, IEEE802.11b,	*See* above re claim 7 which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 278 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Hu
	IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	

Fractus Exhibit 2003
Fractus v. Geotab
Page 279 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON WONG, KIN-LU, JUI-HUNG CHOU, SAOU-WEN SU, AND CHIH-MING SU. "ISOLATION BETWEEN GSM/DCS AND WLAN ANTENNAS IN A PDA PHONE." MICROWAVE AND OPTICAL TECHNOLOGY LETTERS, VOLUME 45, NUMBER 4 (MAY 20, 2005) ("WONG")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of the asserted claims. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1], particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

"Isolation between GSM/DCS and WLAN Antennas in a PDA Phone," by Wong, et al., Microwave and Optical Technology Letters, Vol. 5, No. 4, ("Wong") published May 20, 2005. This paper is prior art under at least pre-AIA 35 U.S.C. § 102(a) or (b), (g)(2) and 103(a). As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent") are invalid as anticipated by Wong.

To the extent that Wong is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Wong alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- Lee, Gwo-Yun, and Wong, Kin-Lu. "Quad-Band Internal Monopole Mobile-Phone Antenna." Microwave and Optical Technology Letters, volume 40, no. 5 (March 5, 2004): pp. 359-361 ("Lee")
- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato")
- U.S. Patent Application Publication No. 2004/0135729 ("Talvitie")

These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including

[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, 16, and 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.

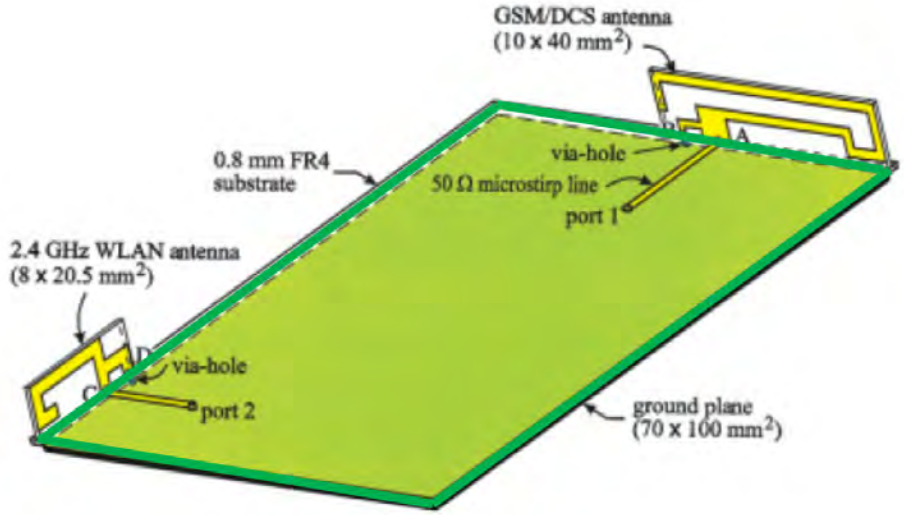
Fractus Exhibit 2003
Fractus v. Geotab
Page 280 of 563

whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants reserve the right to update their constructions and contentions in view of this Court's claim construction order.[2]

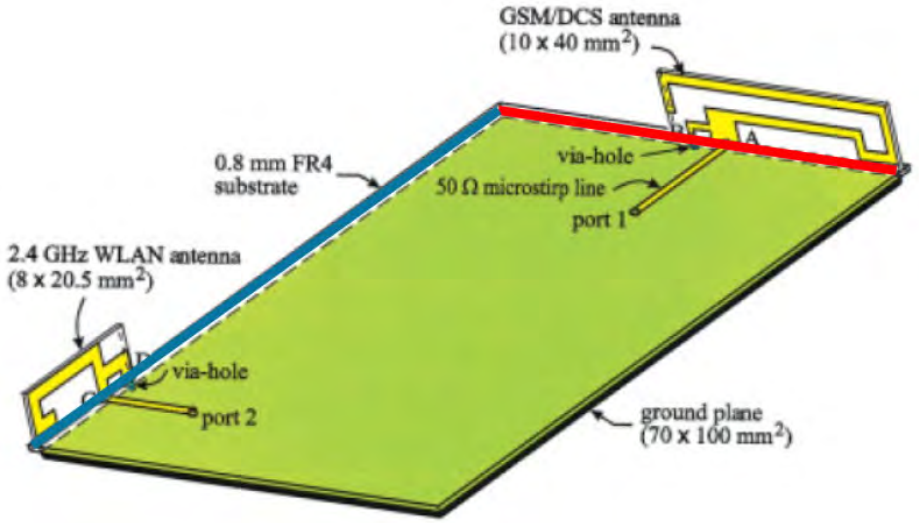
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	Claim 1	
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Wong expressly or inherently discloses this claim element. *See, e.g.*, Wong discloses that Wong's antennas are designed "to perform as internal antenna[s] for PDA phones." Wong, 347.
1[a]	a ground plane;	Wong expressly or inherently discloses this claim element. *See, e.g.*, Wong discloses a ground plane, having "a reasonable size for practical PDA phones." Wong, 348, Fig. 1(a) (annotated below):

[2] Defendants incorporate herein any related work performed by or on behalf of an author or an inventor in the United States under pre-AIA 35 U.S.C. § 102(g)(2). Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

Fractus Exhibit 2003
Fractus v. Geotab
Page 281 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 **Wong, Figure 1(a) (annotated)**
1[b]	the ground plane is inscribed in a rectangular area comprising a first side and a second side,	Wong expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[a].
1[c]	a length of the second side being	Wong expressly or inherently discloses this claim element.

Fractus Exhibit 2003
Fractus v. Geotab
Page 282 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	greater than a length of the first side;	*See, e.g.*, Wong's ground plane, which has a rectangular shape with sides of 70 mm and 100 mm. Wong, 348, Fig. 1(a) (annotated below). Therefore, the length of the second side is greater than the length of the first side.  **Wong, Figure 1(a) (annotated)**
1[d]	a first antenna configured to transmit and receive electromagnetic waves	Wong expressly or inherently discloses this claim element.

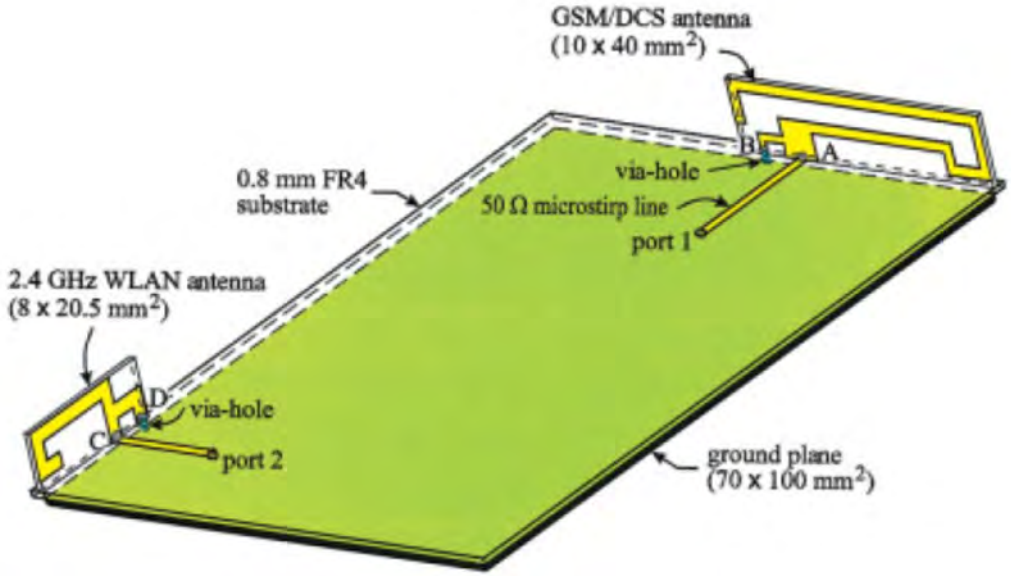
Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	corresponding to at least three frequency bands;	To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. ***See, e.g.*, Lee:** Lee's quad-band GSM/DCS antenna supports four frequency bands for cellular communication. Lee, 359 ("the proposed antenna has wide impedance bandwidths for both its two operating frequencies, thus making the antenna capable of quad-band operation in the advanced mobile phone system (APMS, 824–894 MHz), GSM (890–960 MHz), DCS (1710–1880 MHz), and PCS (1850–1990 MHz) bands.") These frequencies are "electromagnetic waves" and, in fact, three of them match bands described in the '458 patent itself. *See* '458 Patent, 2:4-7 ("these handheld devices also operate in at least one frequency band used for mobile communication services, such as GSM (GSM850, GSM900, GSM1800, American GSM or PCS1900, GSM450)"). A POSA would have been motivated to combine or modify the teaching of Wong's ground planes and antennas for use in a mobile device with or in view of Lee's own ground planes and antennas for use in a mobile device (**hereafter "Wong+Lee"**). Although Wong is focused on testing the isolation from different antenna placements, rather than describing other components of a PDA phone in detail, it motivates use of the described antennas and ground plane in a PDA phone. Similarly, although Lee does not describe other components of a mobile phone in detail, it explains that its antennas are intended as internal components in a mobile phone. Thus, it would have been obvious to use the components described in Wong and Lee in a PDA phone. In the Wong+Lee PDA phone combination, Lee's quad-band GSM/DCS antenna is substituted for Wong's GSM/DCS antenna and located on the ground plane in accordance with Wong's teachings. The resulting combination provides the relative antenna placement described in Wong, with the advantage that the GSM/DCS antenna is a quad-band antenna as taught by Lee.

Fractus Exhibit 2003
Fractus v. Geotab
Page 284 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		POSAs would have had several reasons to substitute Lee's quad-band GSM/DCS antenna for Wong's GSM/DCS antenna. By way of example, Wong's GSM/DCS antenna covers only two cellular bands, the 890–960 MHz range and the 1710–1880 MHz range. Wong, 347. POSAs would have been motivated to replace Wong's dual band GSM/DCS antenna with an antenna operating in additional cellular bands, per Lee, to extend the operability of a PDA phone. POSAs would have had a reasonable expectation of success in replacing Wong's dual-band GSM/DCS antenna with Lee's quad-band GSM/DCS antenna. Both can be used in cellular phones, and both are connected to a ground plane with an area of 70×100 mm^2. Wong, 348; Lee, 359. Because Wong's dual-band GSM/DCS antenna and Lee's quad-band GSM/DCS antenna are geometrically compatible with one another (being connected to ground planes of identical areas), and because the impedance bandwidths of Lee's quad-band antenna are sufficient to cover the desired frequency bands, POSAs would have had a reasonable expectation of success in replacing Wong's dual-band GSM/DCS antenna with Lee's quad-band GSM/DCS antenna. Hereinafter, in the term "Wong+Lee" shall refer to the Wong+Lee PDA phone combination discussed above, featuring Lee's quad-band GSM/DCS antenna. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.
1[e]	the at least three frequency bands being used for mobile	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[d]. Cellular communications are mobile communication services. *See* '458 Patent, 9:26-37 ("In the present document, the expression 'mobile antenna' and similar are used to refer to an antenna

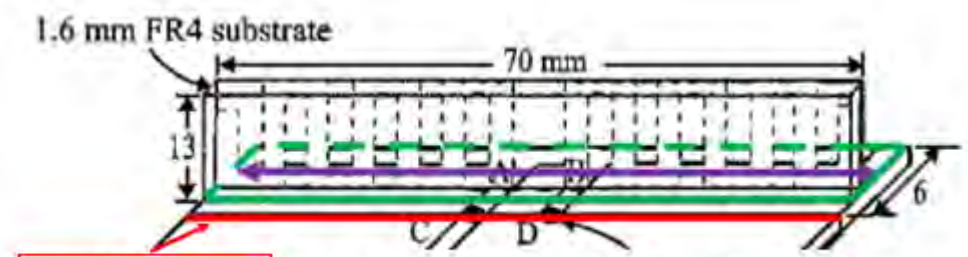
Fractus Exhibit 2003
Fractus v. Geotab
Page 285 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	communication services;	arranged to operate in a band corresponding to a mobile communication service, such as one of the mobile communication services mentioned above (GSM-GSM850, GSM900, GSM1800, American GSM or PCS1900, GSM450-, UMTS, WCDMA, and CDMA).
1[f]	a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong describes a WLAN antenna (separate from the GSM/DCS antenna) operating in the 2400–2484 MHz frequency range. Wong, 347, Fig. 1(a) (annotated below). Wong refers to the 2400–2484 MHz range as the "2.4-GHz band," the "WLAN band" or the "2.4-GHz WLAN band." Wong, 348-350.  **Wong, Figure 1(a) (annotated)**

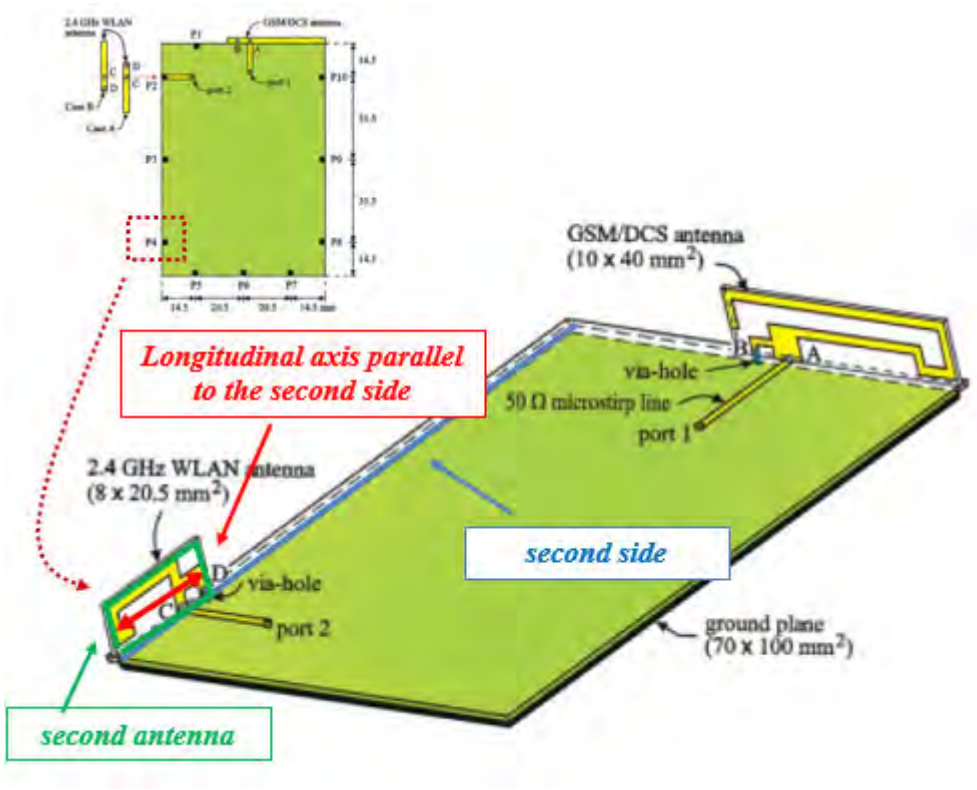
Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
1[g]	the at least one frequency band being used for wireless connectivity services;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong describes that the operational frequency band of the WLAN antenna—the 2400 – 2484 MHz range—is used for WLAN network applications. Wong, 347 ("For this application, it is required that a PDA phone be equipped with two antennas, for example, one GSM/DCS (890–960 MHz/1710–1880 MHz) antenna for cellular operation and one WLAN antenna for 2.4-GHz (2400-2484 MHz) WLAN operation."). According to the '458 patent, WLAN provides "wireless connectivity services." *See* '458 Patent, 25:13-19, claim 7 ("The wireless handheld or portable device according to claim 1, wherein the at least one frequency band used for wireless connectivity services corresponds to… WLAN….")
1[h]	the first antenna extends in a direction substantially parallel to the first side;	Wong+Lee expressly or inherently discloses this claim element. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. ***See, e.g.*, Lee:** For example, Lee's quad-band antenna extends in a direction that is parallel to the first side of Wong's ground plane. Lee, Fig. 1(a) (annotated below).

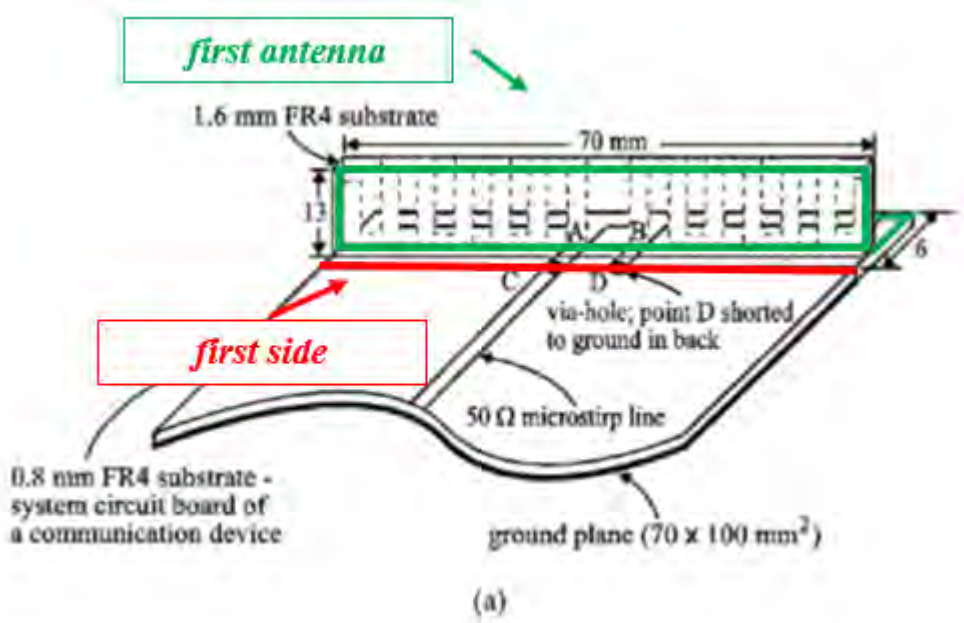
Fractus Exhibit 2003
Fractus v. Geotab
Page 287 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 Lee, Figure 1(a) (in part, annotated) Additionally, it would have been obvious to a person of ordinary skill in the art to modify Wong with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading, and as discussed above.
1[i]	the second antenna extends in a direction substantially parallel to the second side;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong's WLAN antenna, when positioned in correspondence with location P4 of Wong's Figure 2 (reproduced below as an inset to Wong's Figure 1(a)), extends in a direction substantially parallel to the second side of the ground plane. Wong, Fig. 2.

Fractus Exhibit 2003
Fractus v. Geotab
Page 288 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 **Wong, Figure 1(a) (annotated) (with Fig. 2 inset)**
1[j]	the first antenna is arranged substantially close to the first side; and	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*,

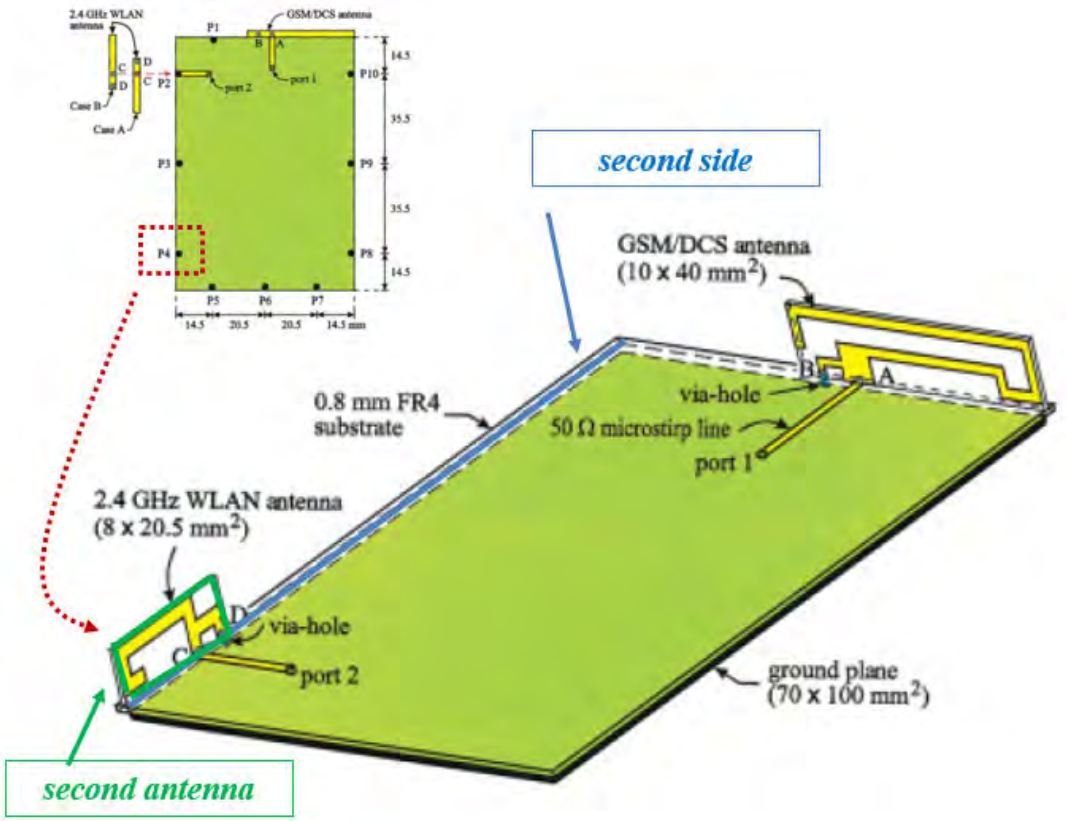
Fractus Exhibit 2003
Fractus v. Geotab
Page 289 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		Wong+Lee. POSAs would have recognized that Wong+Lee's quad-band antenna would have been placed near the top portion of Wong's ground plane because Wong's GSM/DCS antenna and Lee's quad-band antenna (replacing Wong's GSM/DCS antenna in Wong+Lee) are both placed near the top portion of the respective ground plane. Wong, 348 ("the GSM/DCS antenna is arranged to be fixed at the top edge of the system circuit board"). Lee, 359 ("The quad-band monopole antenna is also arranged in a compact structure such that it has a low profile (only 6 mm in this study) and protrudes from the top edge of the system ground plane"); Figure 1(a) (annotated below). Therefore, Wong+Lee's quad-band antenna is arranged substantially close to the first side.  **Lee, Figure 1(a) (annotated)**

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[pre]. In addition, Wong's GSM/DCS antenna and Lee's quad-band antenna are both designed to be placed within the casing of a mobile device. Wong, 347-348 ("Both the GSM/DCS and WLAN antennas are printed PIFAs with compact sizes (see Fig. 1) and can be concealed within the casing of a PDA phone for operation as internal antennas"); Lee, 359 ("we propose another novel dual-frequency planar monopole antenna for application as an internal mobile-phone antenna."). Wong's WLAN antenna is also designed to be placed internally within the casing of the PDA phone. Wong, 347-348 ("Both the GSM/DCS and WLAN antennas are printed PIFAs with compact sizes (see Fig. 1) and can be concealed within the casing of a PDA phone for operation as internal antennas").
Claim 2		
2	The wireless handheld or portable device according to claim 1, wherein the second antenna is arranged substantially close to the second side.	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong's WLAN antenna, when positioned at location P4 of Wong's Figure 2 (reproduced below as an inset to Wong's Figure 1(a)), is arranged substantially close to the second side of the ground plane. Wong, Fig. 1(a) (annotated below).

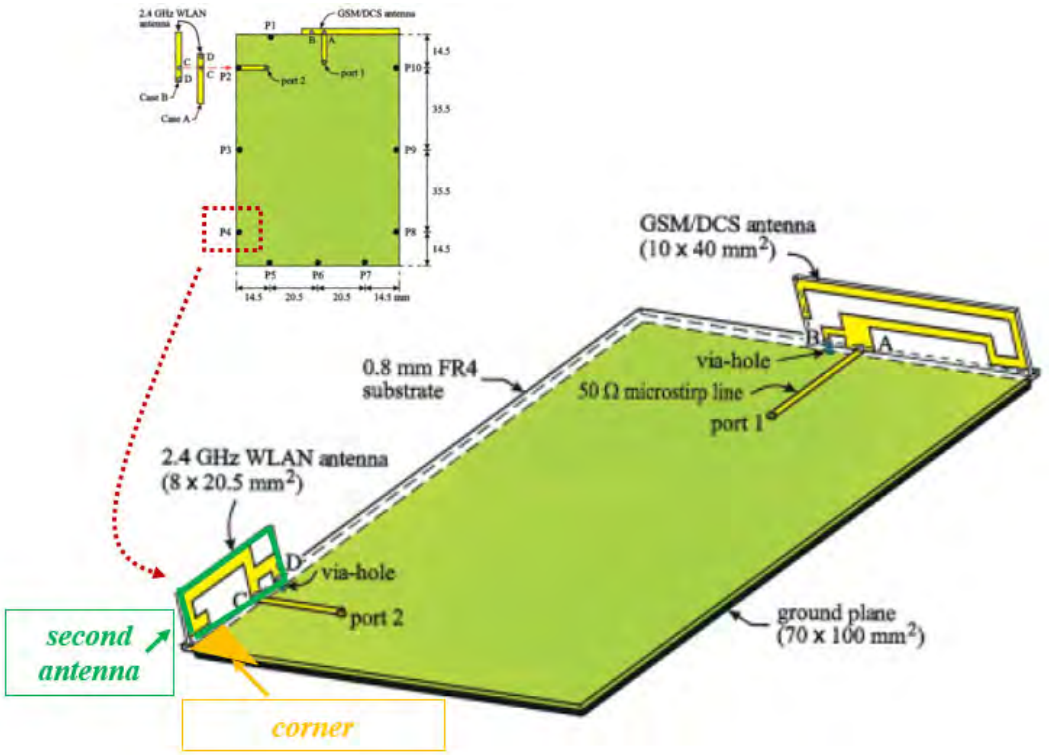
Fractus Exhibit 2003
Fractus v. Geotab
Page 291 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 **Wong, Figure 1(a) (annotated) (with Fig. 2 inset)**

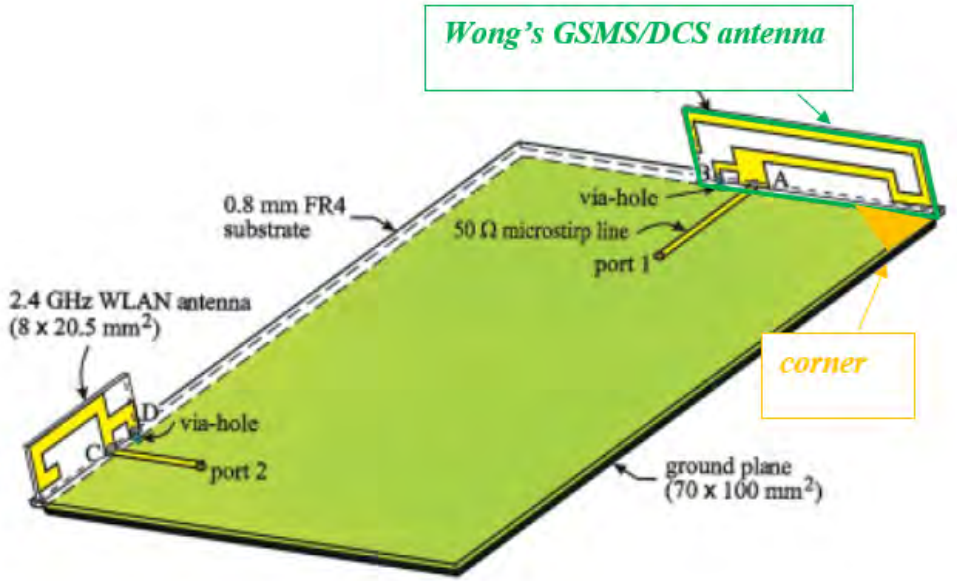
Fractus Exhibit 2003
Fractus v. Geotab
Page 292 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		Claim 3
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially close to a corner of the rectangular area.	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong's WLAN antenna, when positioned at location P4, is arranged substantially close to a corner of the rectangular area defined by the ground plane. Wong, Fig. 1(a) (annotated below):

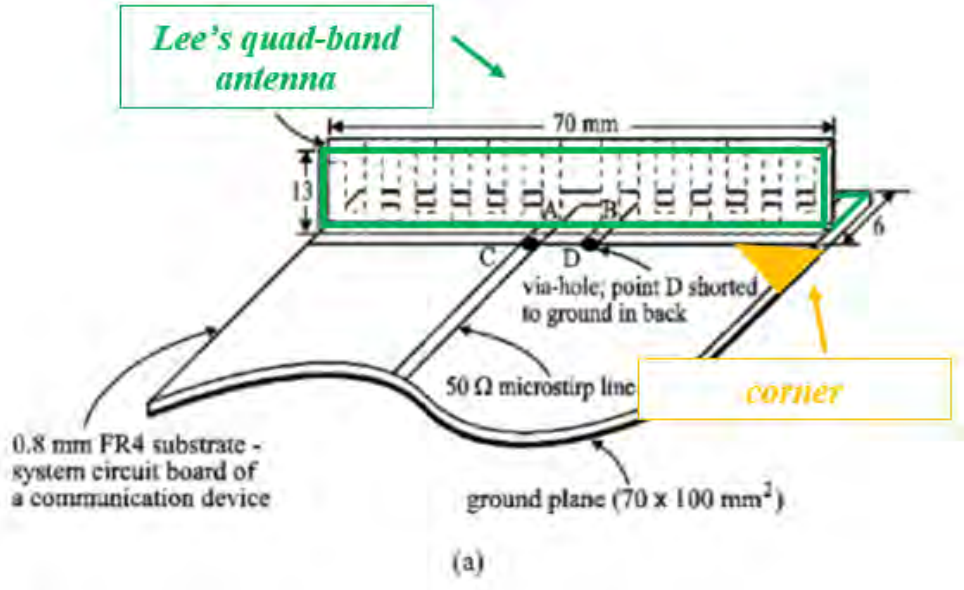
Fractus Exhibit 2003
Fractus v. Geotab
Page 293 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 **Wong, Figure 1(a) (annotated) (with Fig. 2 inset)**
Claim 4		
4	The wireless handheld or portable device	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 294 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	according to claim 1, wherein the first antenna is arranged substantially close to a corner of the rectangular area.	POSAs would have recognized that Wong+Lee's quad-band antenna would have been arranged substantially close to a corner of the rectangular area defined by Wong's ground plane because Wong's GSM/DCS antenna and Lee's quad-band antenna (which replaces Wong's GSM/DCS antenna in Wong+Lee) are both arranged close to a corner of a ground plane. Wong, Figure 1(a) (annotated below); Lee, Figure 1(a) (annotated below).  **Wong, Figure 1(a) (annotated)**

Fractus Exhibit 2003
Fractus v. Geotab
Page 295 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 **Lee, Figure 1(a) (annotated)**
Claim 7		
7	The wireless handheld or portable device according to claim 1, wherein the at least one frequency band used for wireless	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong describes that the frequency band covered by the WLAN antenna—the 2400—2484 MHz range—supports WLAN network applications. Wong, 347 ("For this application, it is required that a PDA phone be equipped with two antennas, for example, one GSM/DCS (890–960 MHz/1710–1880 MHz) antenna

Fractus Exhibit 2003
Fractus v. Geotab
Page 296 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	connectivity services corresponds to at least one wireless connectivity service selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	for cellular operation and one WLAN antenna for 2.4-GHz (2400–2484 MHz) WLAN operation."). WLAN is one of the wireless connectivity service listed in claim 7.
Claim 8		
8[pre]	A portable device comprising:	*See* above regarding claim element 1[pre] which is incorporated by reference herein.
8[a]	a ground plane;	*See* above regarding claim element 1[a] which is incorporated by reference herein.

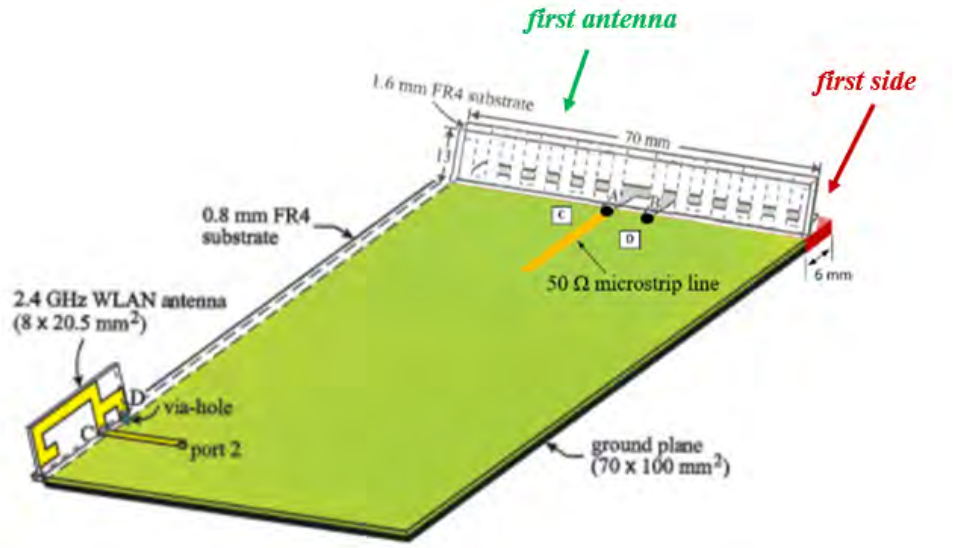
Fractus Exhibit 2003
Fractus v. Geotab
Page 297 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
8[b]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	*See* above regarding claim element 1[c] which is incorporated by reference herein.
8[c]	the at least three frequency bands being used for mobile communication services;	*See* above regarding claim element 1[d] which is incorporated by reference herein.
8[d]	a second antenna configured to operate in at least one frequency band;	*See* above regarding claim element 1[e] which is incorporated by reference herein.
8[e]	the first antenna extends in a direction substantially parallel to a first	The Wong+Lee PDA phone combination expressly or inherently discloses this claim element. This combination and the reasons for making it are described in connection with claim 1 above, and incorporated here.

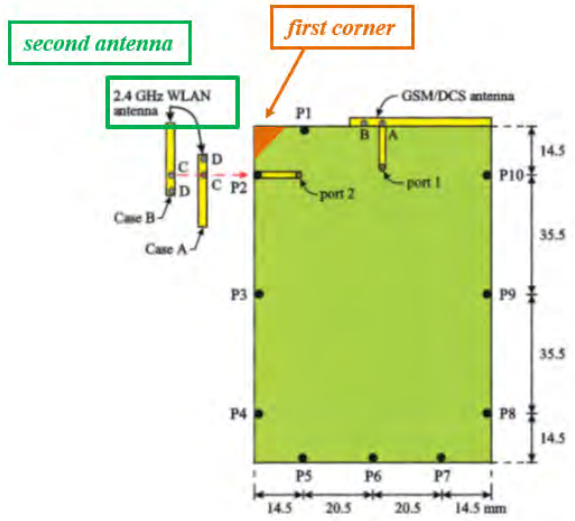
Fractus Exhibit 2003
Fractus v. Geotab
Page 298 of 563

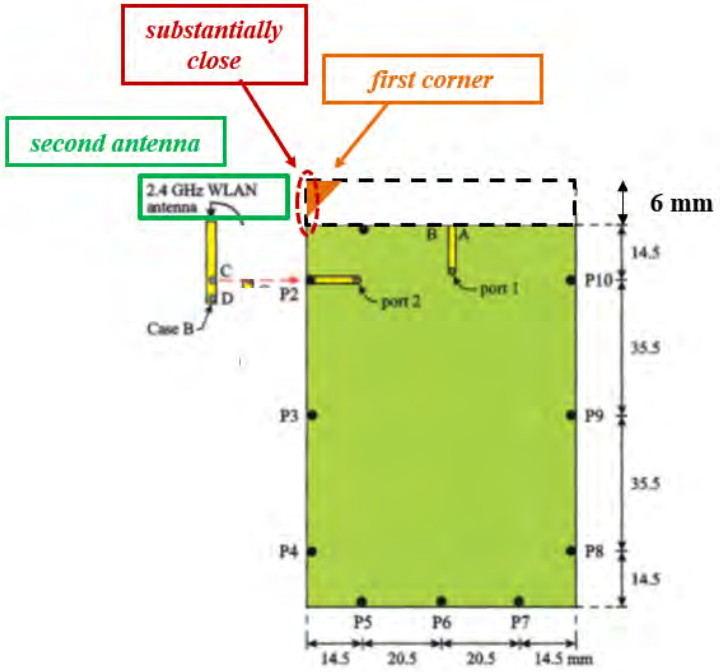
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	side of the portable device;	*See, e.g.*, Wong+Lee meets 8[e] because Lee's quad-band antenna ("first antenna") extends in a direction parallel to the short edge (first side) of the system circuit board (and hence of the portable device sized commensurate with the PCB). Claim 1[g]; Lee, Fig. 1(a).
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	The Wong+Lee PDA phone combination expressly or inherently discloses this claim element. This combination and the reasons for making it are described in connection with claim 1 above, and incorporated here. *See, e.g.*, Wong+Lee meets 8[f] because it uses Wong's ground plane having a second side (100mm) and a first side (70mm). Claim 1[b]; Wong, 348, Fig. 1(a). Wong+Lee adds another 6mm length to Wong's 100mm long substrate, beyond the region backed by Wong's ground plane. Claim 1[b]. Thus, the resulting ground plane edges (and hence the sides of the Wong+Lee "portable device" containing and commensurate with PCB dimensions) satisfy the requirement that a length of the second side [106mm] is greater than a length of the first side [70mm].
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	The Wong+Lee PDA phone combination expressly or inherently discloses this claim element. This combination and the reasons for making it are described in connection with claim 1 above, and incorporated here. *See, e.g.*, Wong+Lee meets 8[g] because Lee's quad-band antenna ("first antenna") is disposed at the same location as Wong's GSM/DCS antenna, and the horizontal monopole element spans the 6mm ungrounded substrate portion to the top edge of the ground plane. The "portable device" is commensurate with

Fractus Exhibit 2003
Fractus v. Geotab
Page 299 of 563

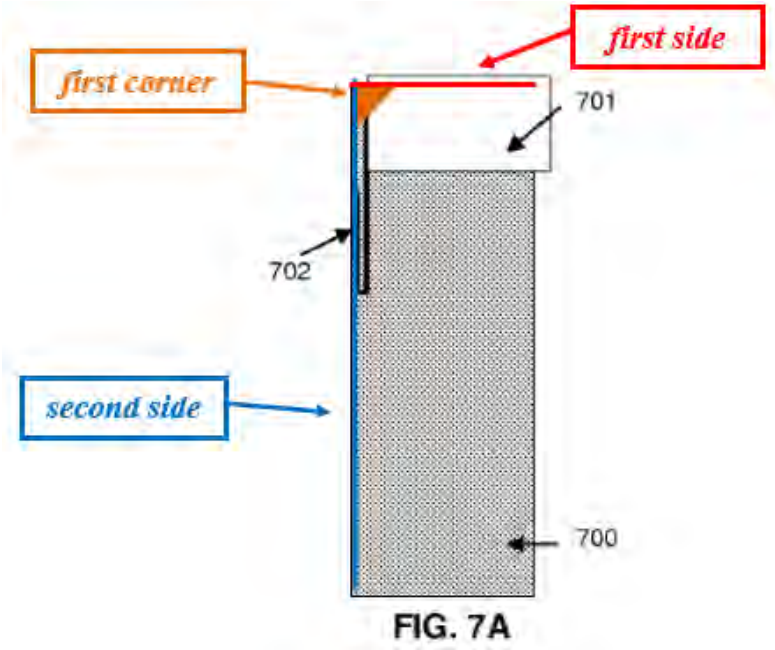
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		Wong+Lee's PCB dimensions, and the short edge near the top of the ground plane is the first side. Claim 1[i].  Wong+Lee
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	The Wong+Lee PDA phone combination expressly or inherently discloses this claim element. This combination and the reasons for making it are described in connection with claim 1 above, and incorporated here. *See, e.g.*, Wong+Lee meets 8[h] because Wong describes a WLAN antenna ("second antenna") position at P2, proximate the upper left corner of the ground plane. Wong, Fig. 2 (annotated below).

Fractus Exhibit 2003
Fractus v. Geotab
Page 300 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		In Wong's "Case B," the WLAN antenna is positioned adjacent the "first corner." When located at Position P2, Wong's WLAN antenna is at least as close to the upper left corner as, for example, antenna 702 in Figure 7(a) of the '458 patent is to the corresponding corner.  **Wong, Figure 2 (annotated)** Wong+Lee's portable device is sized commensurate with the 106mm×70mm PCB. Thus, in Wong+Lee, the "first corner" is laterally displaced 6 mm from Wong's configuration, so that the WLAN antenna is positioned at (6/106)=5.7% of the length of the long axis (second side) from the device's corner. This is "substantially close" as claimed.

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 **Wong + Lee**
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic:	The Wong+Lee PDA phone combination expressly or inherently discloses this claim element. This combination and the reasons for making it are described in connection with claim 1 above, and incorporated here. *See, e.g.*,

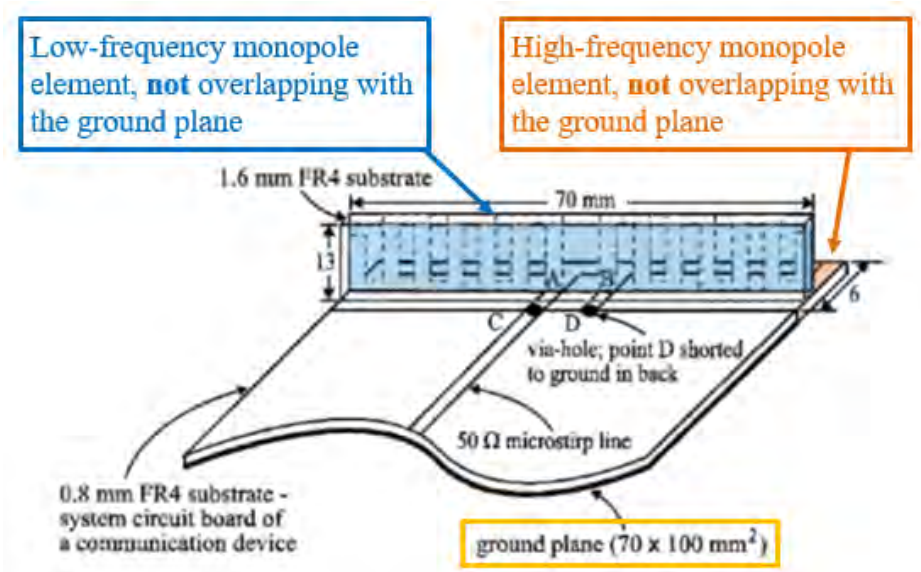
Fractus Exhibit 2003
Fractus v. Geotab
Page 302 of 563

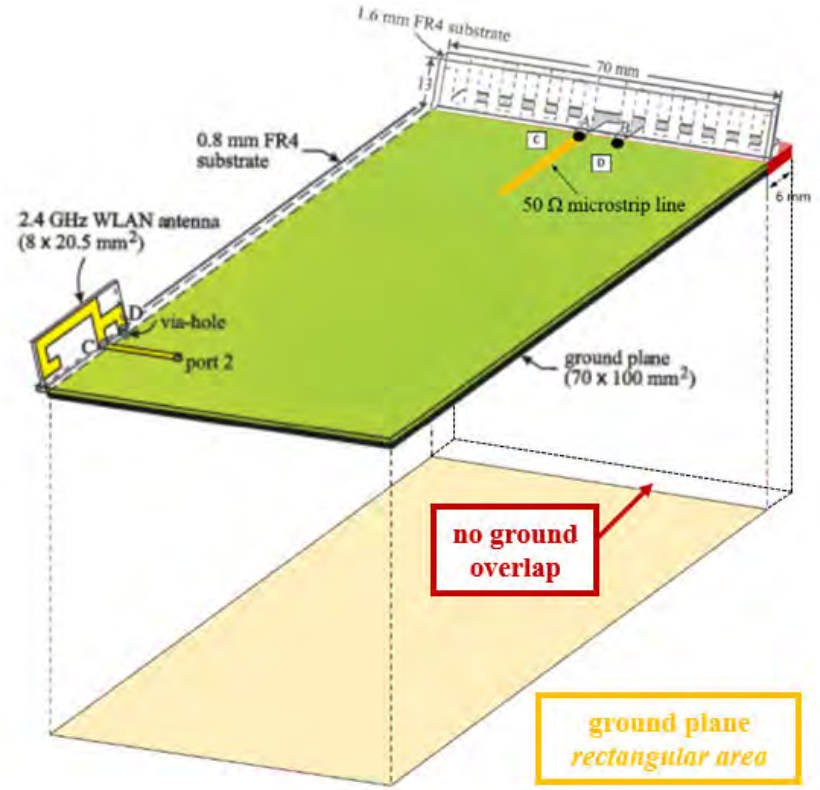
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	intersecting] with an end of the second side of the portable device; and	As written, this limitation contains a typographical error. Assuming it refers to a corner where the first and second sides intersect (shown in the annotated Figure 7(a) below), then Wong+Lee meets 8[i] for the same reason that Wong+Lee meets 8[h].  **'458 patent, Figure 7(a) (annotated)**
8[j]	the first antenna and the second antenna are located	*See* above regarding claim element 1[j] which is incorporated by reference herein.

Fractus Exhibit 2003
Fractus v. Geotab
Page 303 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	internally within the portable device.	
	Claim 9	
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, The ’458 patent teaches: “In some examples, the fraction of the projection of the slot occupied by ground plane will be less than, or approximately equal to… 5% of the projection of the slot on the PCB.” ’458 Patent, 11:6-9. Thus, the ’458 patent contemplates an overlap of less than 5%, including no overlap. Lee’s quad-band antenna has an orthogonal projection, on the plane that contains the ground plane, that does not overlap with the ground plane because the antenna is disposed on a portion of the substrate not backed by the ground plane. Lee, 359, Figure 1(a) (annotated below).

Fractus Exhibit 2003
Fractus v. Geotab
Page 304 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 In Wong+Lee, Lee's quad-band antenna ("first antenna") likewise has an orthogonal projection "on a plane containing the ground plane" that does not overlap with the ground plane, meeting claim 9.

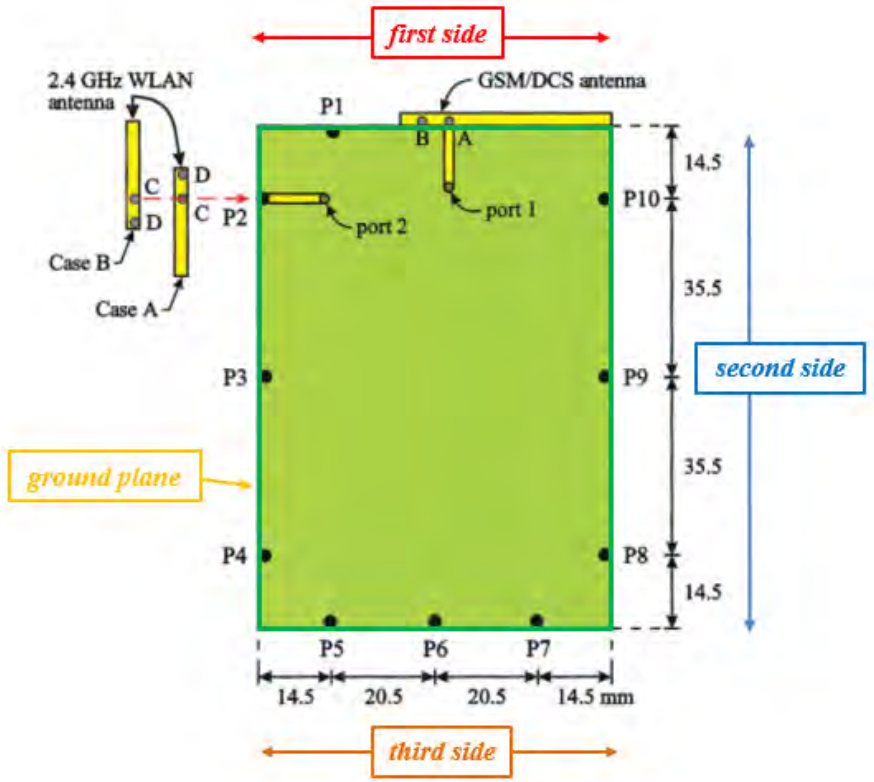
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		 Wong+Lee
Claim 11		

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	Wong+Lee expressly or inherently discloses this claim element. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. ***See, e.g.*, Sato** at [0040] – [0041]: "The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch." ***See also, e.g.*, Talvitie** at [0022], [0024], [0026], [0037]: "FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120, and a second radiator 130."

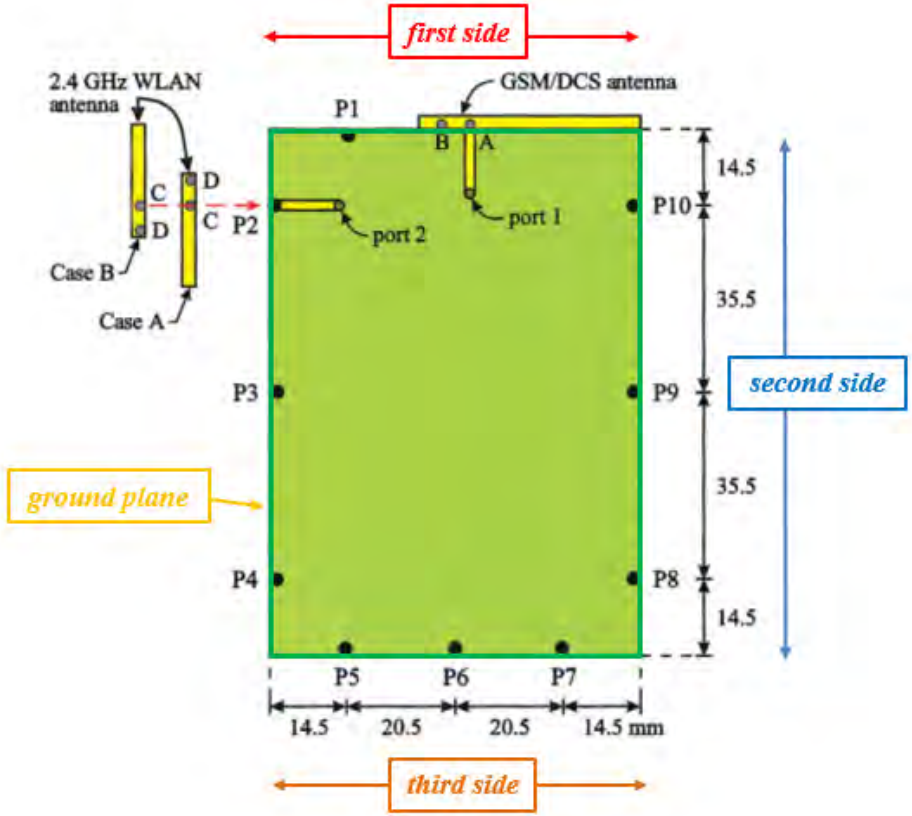
Fractus Exhibit 2003
Fractus v. Geotab
Page 307 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		"the groove plane antenna is configured to radiate at least within one lower frequency range and within one or more higher frequency ranges…" "An example of a multifrequency mobile station configured to support MGSP 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges." "It is also possible to configure all GSM functionalities in one antenna A1 and, similarly, all WCDMA functionalities (transmission and reception) in another antenna A2 by means of a duplex filter…the strong isolation between the antennas reduces power losses between the antennas in such a configuration as well; this, again, preferably cuts down thermal losses and power consumption of the mobile station."
Claim 14		
14[pre]	A wireless handheld or portable device comprising:	*See* above regarding claim element 1[pre] which is incorporated by reference herein.
14[a]	a ground plane;	*See* above regarding claim element 1[a] which is incorporated by reference herein.
14[b]	the ground plane is inscribed in a first rectangular area comprising a first side, a second side and a third side,	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong's ground plane is inscribed in a 100mm×70mm rectangular area. The second side is 100mm; the first and third sides are 70mm. Wong, 348; Wong, Figure (2) (annotated below).

Fractus Exhibit 2003
Fractus v. Geotab
Page 308 of 563

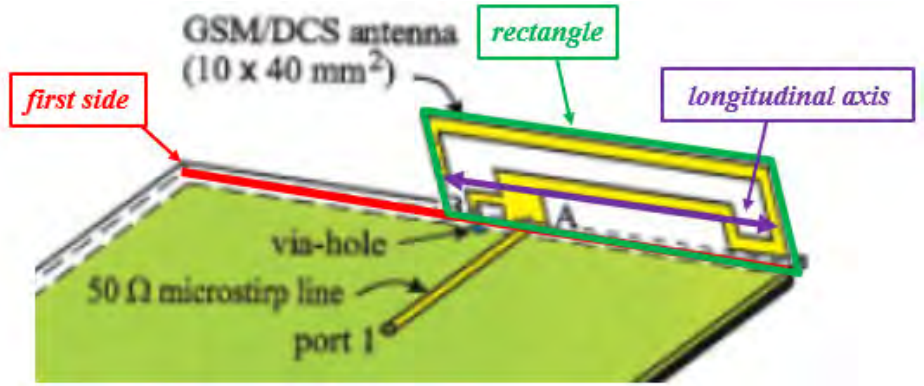
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		
14[c]	a length of the second side being greater than a length of the first side and a length of the third side;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.,*

Fractus Exhibit 2003
Fractus v. Geotab
Page 309 of 563

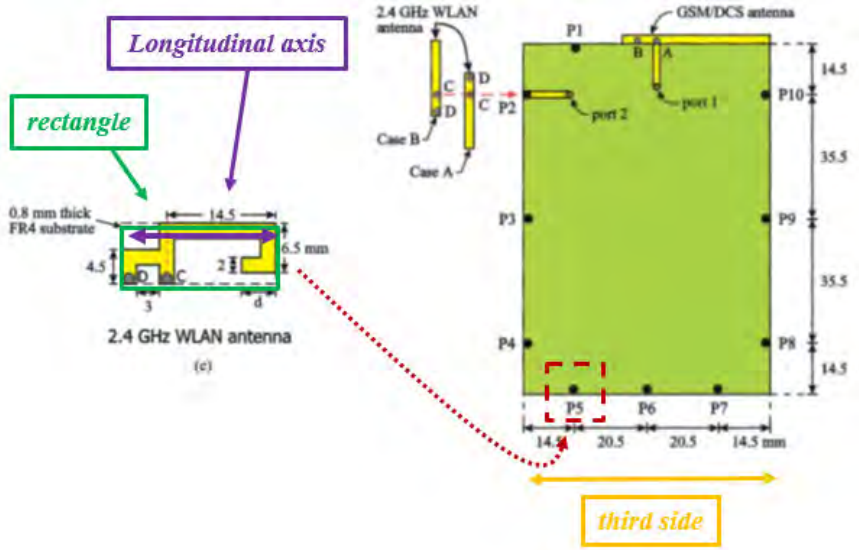
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		Wong's ground plane is inscribed in a 100mm×70mm rectangular area. The second side is 100mm; the first and third sides are 70mm. Wong, 348. The second side is longer than the first and third sides. Wong, Figure (2) (annotated below). 

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
14[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least two frequency bands;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, The GSM900 (890–960 MHz) and DCS1800 (1710–1880 MHz) bands support cellular communications as used by mobile devices. Wong, 347.
14[e]	the at least two frequency bands being used for mobile communication services;	*See* Claim 1[d]. The GSM900 (890–960 MHz) and DCS1800 (1710–1880 MHz) bands support cellular communications as used by mobile devices. Wong, 347.
14[f]	a second antenna configured to operate in at least one frequency band;	*See* above regarding claim element 8[d] which is incorporated by reference herein.
14[g]	the at least one frequency band being different from the at least two frequency bands;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong's WLAN antenna operates in the 2.4 GHz ISM band (2400–2500 MHz), which is different from the GSM (890–960 MHz) and DCS (1710–1880 MHz) bands. Wong, 347-348.

Fractus Exhibit 2003
Fractus v. Geotab
Page 311 of 563

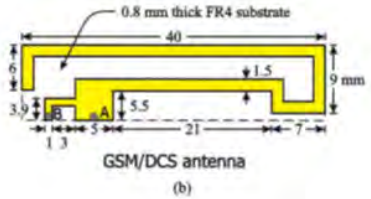
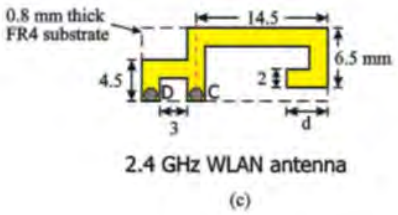
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
14[h]	the first antenna extends in a direction substantially parallel to the first side;	*See* Claim 1[g]. Wong's GSM/DCS antenna can be inscribed in a rectangle having a longitudinal axis parallel to a short edge (first side) of Wong's ground plane. Wong, Figure 1(a) (annotated detail below). 
14[i]	the first antenna is proximate to the first side;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, The GSM/DCS antenna ("first antenna") is "arranged to be fixed at the top edge of the system circuit board" (i.e., the first side of the ground plane, as discussed above in 14[b]. Wong, 348.
14[j]	the second antenna extends in a direction substantially	*See* above regarding claim element 1[i] which is incorporated by reference herein. *See also, e.g.*,

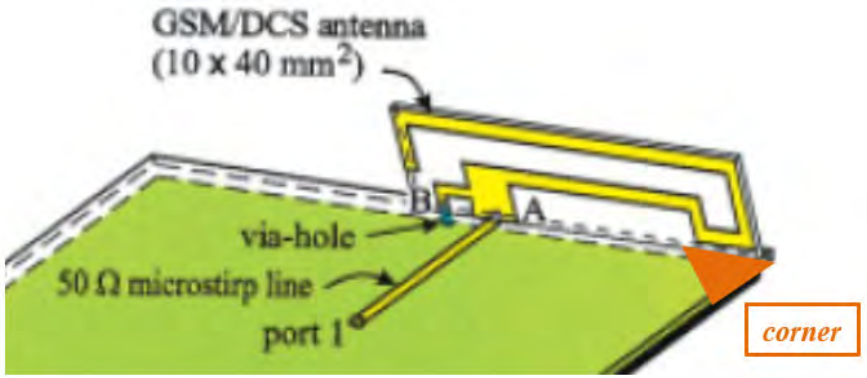
Fractus Exhibit 2003
Fractus v. Geotab
Page 312 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	parallel to the third side;	Wong's WLAN antenna, when positioned at location P5 of Figure 2, "extends in a direction substantially parallel to" the ground plane rectangle's third side. Wong, Fig. 2 (annotated below with Fig. 1(c) inset). Although Wong does not expressly show the WLAN antenna's orientation when positioned at P5, POSAs would have understood that the WLAN antenna would be orientated so that both feeding point C and shorting point D were fixed at the system circuit board's lower edge (the "third side" in annotated Figure 2 below). With that orientation, the WLAN antenna can be inscribed in a rectangle having a longitudinal axis that is parallel to the third side of Wong's ground plane. Wong, Figs. 1(c), 2 (annotated below). 

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
14[k]	the second antenna is proximate to the third side;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong's WLAN antenna at location P5 is fixed at the system circuit board's lower edge, which is "proximate to the third side." Wong, Fig. 2.
14[l]	the second antenna is inscribed in a second rectangular area;	Wong expressly or inherently discloses this claim element. *See, e.g.*, Wong's WLAN antenna is inscribed in a rectangular area. *See* Figs. 1(a), 1(c).
14[m]	a sum of a length and a width of the second rectangular area is smaller than a quarter of an operating wavelength of the second antenna;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong meets 14[m] because the rectangular area inscribing the WLAN antenna is 8mm×20.5mm (Wong, 348), so "a sum of a length and a width of the second rectangular area" is 28.5mm. An "operating wavelength" (λ, in mm) of an antenna depends on its operating frequency, as follows: $$\lambda = \frac{c}{f},$$ where c = speed of light in vacuum (≈3x1011 mm/sec), and f = frequency (Hz). Thus, 1/4 of the WLAN antenna's operating wavelengths at 2400-2484 MHz (Wong, 347) are:

Fractus Exhibit 2003
Fractus v. Geotab
Page 314 of 563

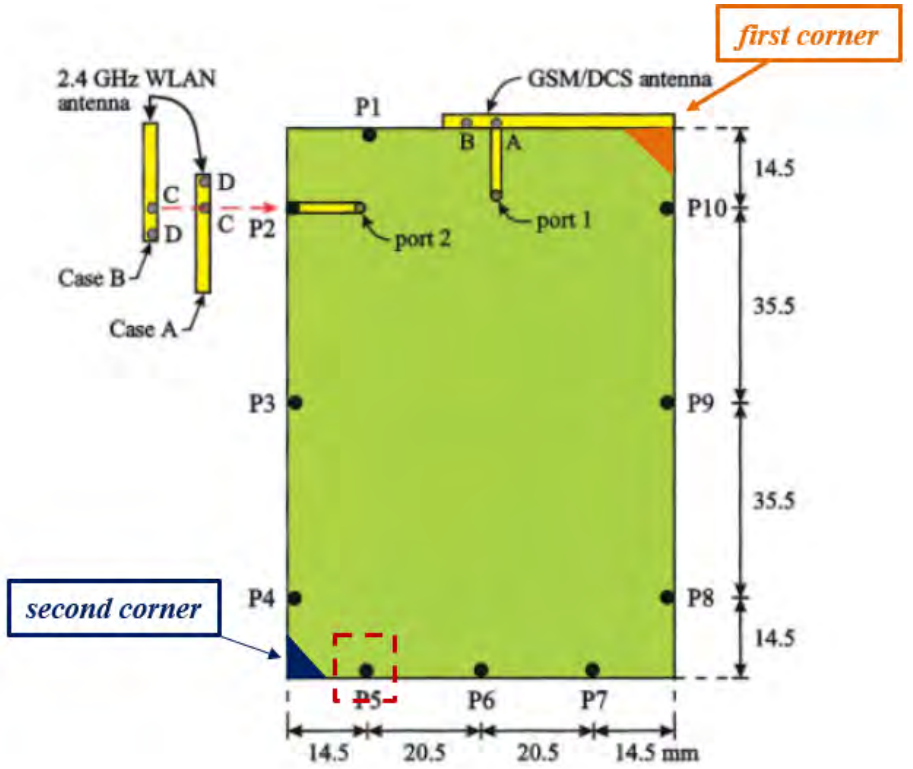
Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		<table><tr><th>Frequency (MHz)</th><th>Wavelength (mm)</th><th>1/4 Wavelength (mm)</th></tr><tr><td>2400-2484</td><td>120.8-125.0</td><td>30.2-31.25</td></tr></table> Wong meets 14[m] because 28.5mm is less than 30.2 mm.
14[n]	a geometry of the first antenna being different than a geometry of the second antenna;	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong's GSM/DCS antenna's geometry is "different" from the WLAN antenna's geometry. Wong, Figs. 1(b)-(c) (below):  GSM/DCS antenna (b)  2.4 GHz WLAN antenna (c)
14[o]	at least one of the first antenna and the second antenna is proximate to a corner of the first	Wong+Lee expressly or inherently discloses this claim element. *See, e.g.*, Wong's GSM/DCS antenna is "proximate to a corner" of the rectangular area inscribing Wong's ground plane. Wong, Fig. 1(a) (annotated detail below).

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	rectangular area; and	
14[p]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	*See, e.g.*, Claim 1[j].
Claim 15		
15[pre]	The wireless handheld or portable device	*See* above regarding claim 14 which is incorporated by reference herein.

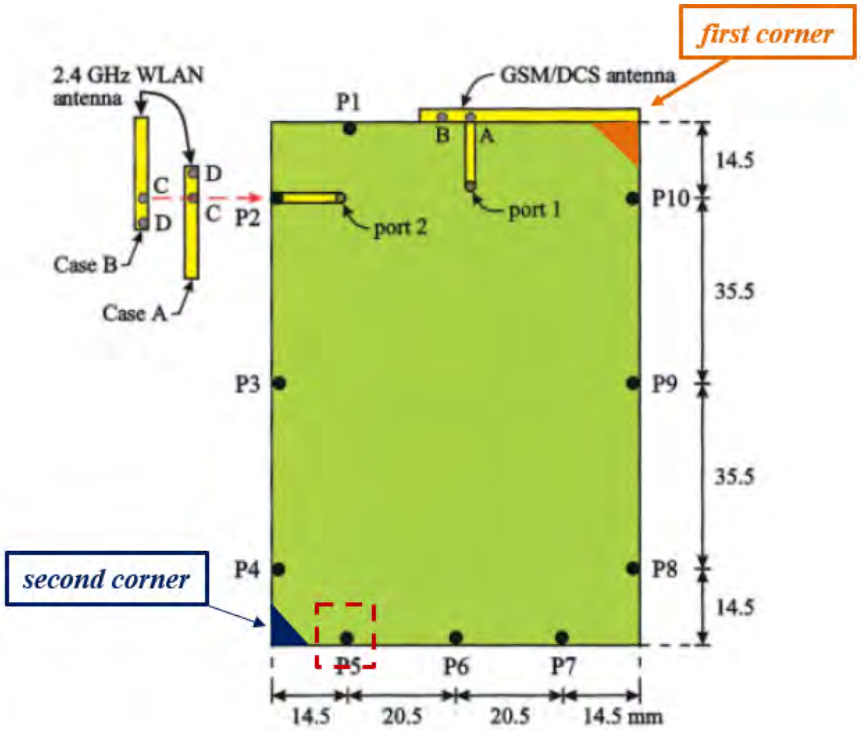
Fractus Exhibit 2003
Fractus v. Geotab
Page 316 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	according to claim 14,	
15[a]	wherein the first antenna is proximate to a first corner of the first rectangular area and	*See* above regarding claim 4 which is incorporated by reference herein. *See, e.g.*, Claim 14[o]. Wong's GSM/DCS antenna is proximate to a first corner of the rectangular area inscribing Wong's ground plane. Wong, Figure 2 (annotated below).

Fractus Exhibit 2003
Fractus v. Geotab
Page 317 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
		
15[b]	the second antenna is proximate to a second corner of the	*See* above regarding claim 3 which is incorporated by reference herein. *See also, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	first rectangular area.	Wong, when positioned at P5 the WLAN antenna is proximate to a "second corner" of the rectangular area. Wong, Figure 2 (annotated below). 
17	The wireless handheld or portable device according to claim 14, wherein the at	*See, e.g.*, Claim 7.

Fractus Exhibit 2003
Fractus v. Geotab
Page 319 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Wong
	least one frequency band is used for a wireless connectivity service selected from the group comprising: Bluetooth™, IEEE802.11a, IEEE802.11b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	

Fractus Exhibit 2003
Fractus v. Geotab
Page 320 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2 BASED ON U.S. PATENT PUB. NO. 2006/0082503 ("GAUCHER")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of the asserted claims. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1], particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

U.S. Patent Pub. No. 2006/0082503 to Gaucher et al. ("Gaucher") was filed on October 18, 2004, published on April 20, 2006. This patent is prior art under at least 35 U.S.C. § 102(a), (b), (e), or (g)(2) and 103(a). As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Gaucher.

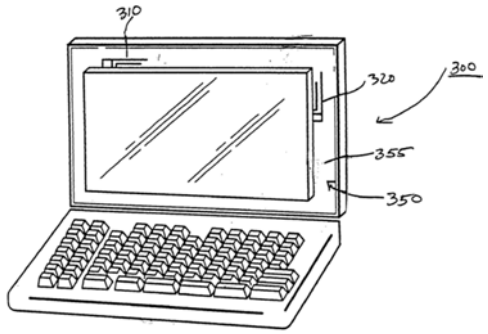
To the extent that Gaucher is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Gaucher alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Pub. No. 2004/0113848 to Gaucher et al. ("Gaucher848")
- U.S. Patent App. Pub. No. 2002/0021250 to Asano et al. ("Asano")
- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato")
- U.S. Patent Application Publication No. 2004/0135729 ("Talvitie")

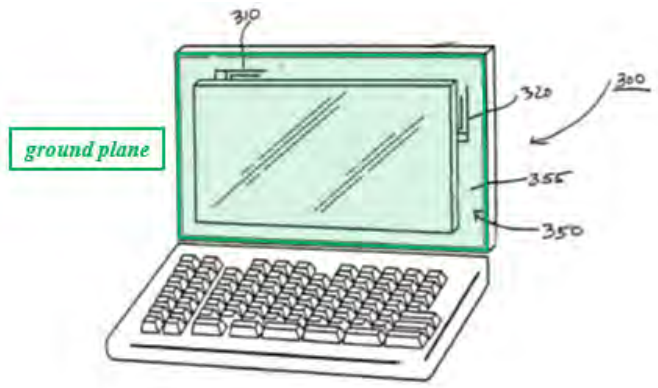
These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants reserve the right to update their constructions and contentions in view of this Court's claim construction order.[2]

[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, 16, and 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.
[2] Defendants incorporate herein any related work performed by or on behalf of an author or an inventor in the United States under pre-AIA 35 U.S.C. § 102(g)(2). Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

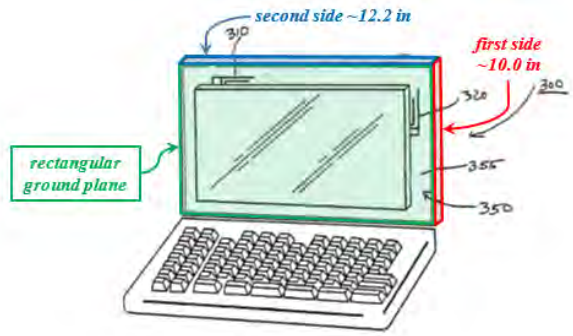
Fractus Exhibit 2003
Fractus v. Geotab
Page 321 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
	Claim 1	
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher teaches "a laptop computer 300" shown in Figure 3 below. Gaucher, [0025]. Gaucher's laptop computer 300 is a "portable device." Gaucher, [0001] (describing "portable devices such as laptop computers and cellular phones"). Per the '458 patent, a laptop is also a "handheld device." '458 Patent, 1:34-41, 8:39-47.  FIG. 3 Gaucher's laptop is a wireless handheld/portable device because it includes "a plurality of multiband antennas 310, 320 mounted on the support frame 355 of the laptop display unit 350" and it was known that laptops like Gaucher's were "used on the road and away from [WLAN] hot spot locations." Gaucher, [0025]-[0027].

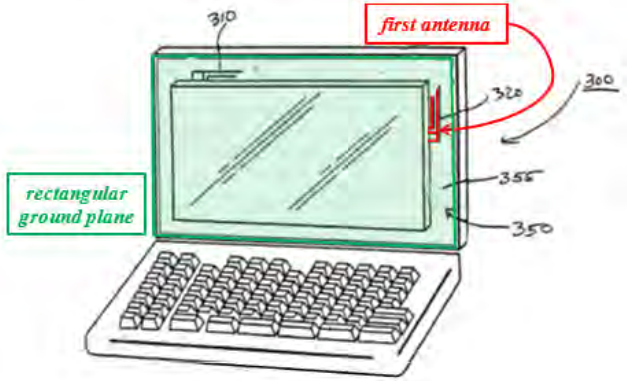
Fractus Exhibit 2003
Fractus v. Geotab
Page 322 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
1[a]	a ground plane;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher's laptop includes a ground plane implemented as "support frame 355 of the laptop display unit 350." Gaucher, [0025]. According to Gaucher, "the metal frame of the display unit is used as a ground plane for the antennas," e.g., "multiband antennas 310, 320 mounted on the support frame 355." Gaucher, [0025], [0032], Fig. 3 (annotated below).  FIG. 3
1[b]	the ground plane is inscribed in a rectangular area comprising a first side and a second side,	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, In Gaucher's Figure 3 (annotated below), support frame 355 (the ground plane) inscribes an area supporting a rectangular laptop display like the display in Application No. 09/076,557 (published

Fractus Exhibit 2003
Fractus v. Geotab
Page 323 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		as Asano where "display panel 13" is "a plate approximately rectangular." Asano, [0083]; Gaucher, [0024] (incorporating Asano by reference). While Gaucher does not provide the display frame's dimensions, such rectangular laptops were conventional, e.g., the IBM ThinkPad T42 having a rectangular support frame where *a length of the second side* (approximately 12.2 in) is greater than *a length of a first side* (approximately 10.0 in) for a 14.1 in display. *See, e.g.*, New IBM ThinkPad T42 notebooks feature new fingerprint and Intel PRO/Wireless Technologies pg. 7, Jan. 11, 2005; Dialogue Flybook, User's Manual, pg. 22, 2003 (describing the Dialogue Flybook supporting a 1024×600 resolution, 8.9 in. display).  FIG. 3

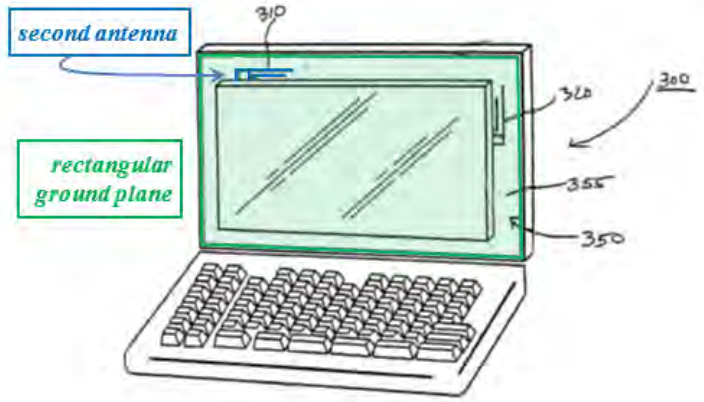
Fractus Exhibit 2003
Fractus v. Geotab
Page 324 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
1[c]	a length of the second side being greater than a length of the first side;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[b].
1[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher's laptop computer 300 includes "a plurality of multiband antennas 310, 320 mounted on the support frame 355 of the laptop display unit 350." Gaucher, [0025], Fig. 3 (annotated below). Multiband antenna 320 is a first antenna.  FIG. 3 Gaucher's antenna 320 can be "a compact-sized quadband antenna covering the four most popular frequency bands, namely, 824-894 MHz [e.g., GSM850]… 880-960 MHz [e.g., GSM900 /

Fractus Exhibit 2003
Fractus v. Geotab
Page 325 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		extended GSM900]… 1710-1880 MHz [e.g., GSM1800 or DCS1800]… and 1850-1990 MHz [e.g., PCS1900]….” Gaucher, [0030]. A POSA would have understood that “covering” these frequency bands means the antenna supports both uplink and downlink communications (i.e., transmit and receive). Digital Cellular Telecommunications System (Phase 2+); Radio Transmission and reception (3GPP TS 45.005 version 4.3.0 Release 4), pg. 9 (April 2001). Gaucher’s antenna 320 (i.e., a first antenna), implemented as a quadband antenna, is thus “configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands.”
1[e]	the at least three frequency bands being used for mobile communication services;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, According to the ’458 patent, a “frequency band being used for mobile communication services” includes GSM850, GSM900, GSM1800, and PCS1900. ’458 Patent, 2:4-10. GSM850 operates in the 824-894 MHz frequency range, GSM900 operates in the 890-960 MHz range, GSM1800 operates in the 1710-1880 MHz range, and PCS1900 operates in the 1850-1990 MHz range. Digital Cellular Telecommunications System (Phase 2+); Radio Transmission and reception (3GPP TS 45.005 version 4.3.0 Release 4), pg. 9 (April 2001); ’458 Patent, 9:26-43 (defining “mobile or cellular communication standards” as operating in, e.g., “the 810 MHZ-960 MHz” or “1710 MHz-1990 MHz” regions). Gaucher’s antenna 320 implementing the quadband antenna transmits and receives in “the four most popular frequency bands” in 2004 for mobile communications, i.e., 824-894 MHz (GSM850), 890-960 MHz (GSM900), 1710-1880 MHz (GSM1800), and 1850-1990 MHz (PCS1900). Gaucher, [0030]; Digital Cellular Telecommunications System (Phase 2+); Radio Transmission and reception (3GPP TS 45.005 version 4.3.0 Release 4), pg. 9 (April 2001). Thus, implementing Gaucher’s antenna 320 as a quadband antenna is “a first antenna configured to transmit and receive” in “at least three frequency bands being used for mobile communication services.”

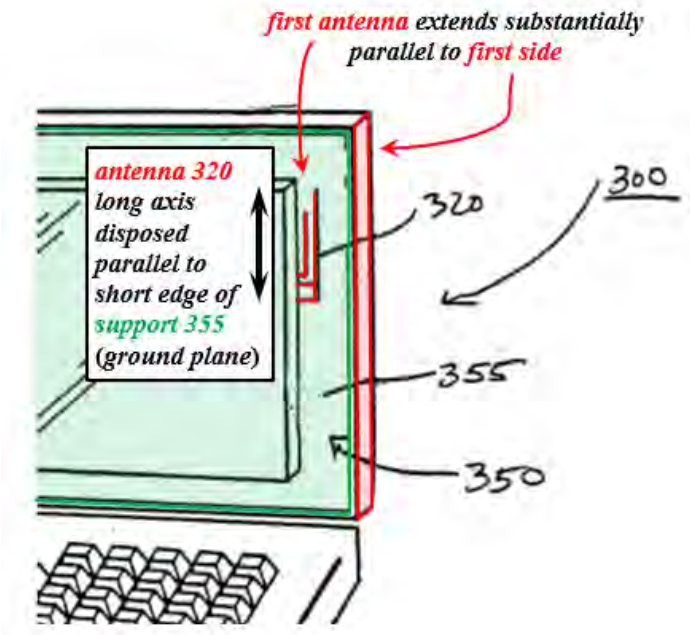
Fractus Exhibit 2003
Fractus v. Geotab
Page 326 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
1[f]	a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher's laptop computer 300 includes "a plurality of multiband antennas 310, 320 mounted on the support frame 355 of the laptop display unit 350," where antenna 320 is a first antenna. Gaucher, [0025], Fig. 3 (annotated below). Multiband antenna 310 is a second antenna.  FIG. 3 Antenna 310 can be "integrated antenna designs described in the above-incorporated patent applications and patents," such as the tri-band antenna described in Gaucher848 that "operate[s] in the 2.4-2.5 GHz, 5.15-5.35 GHz and 5.47-5.85 GHz bands." Gaucher, [0030], [0024] (incorporating Gaucher848 by reference); Gaucher848, [0011]. Gaucher848's antenna receives electromagnetic waves, e.g., when operating an 802.11b wireless connectivity service that transmits and receives data in the 2.4–2.84 GHz range to "provide up to 11 Mbps data rate." IEEE Std 802.11b-1999, Pt. 11, pg. 41, 51; Gaucher848, [0009], [0013]. Likewise, when operating an

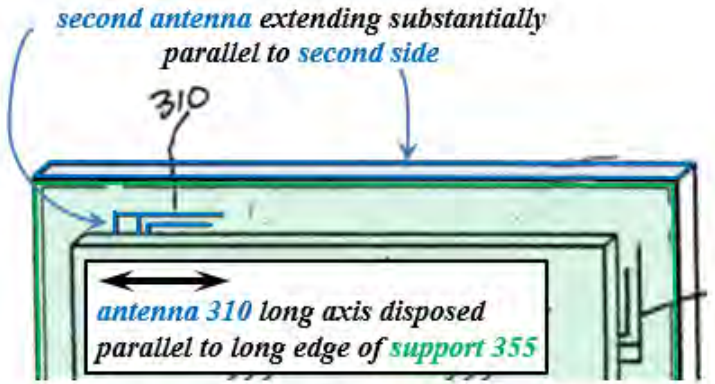
Fractus Exhibit 2003
Fractus v. Geotab
Page 327 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		802.11a service, Gaucher848's antenna transmits and receives data in the 5.15–5.25, 5.25–5.35 and 5.725–5.825 GHz ranges. IEEE Std 802.11a-1999, Pt. 11, 3-4, 24, Fig. 118 (transmitter and receiver block diagram); Gaucher848, [0009], [0013]. Gaucher's antenna 310 (second antenna) implemented as Gaucher848's tri band antenna, is thus "a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band."
1[g]	the at least one frequency band being used for wireless connectivity services;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher's antenna 310 implemented as Gaucher848's tri-band wireless antenna is "a second antenna" included in Gaucher's laptop 300 that "operate[s] in the 2.4-2.5 GHz, 5.15-5.35 GHz and 5.47-5.85 GHz bands." Gaucher, [0030], [0024], [0026]; Gaucher848, [0008]-[0009], [0011], [0056], Figs. 9, 10.
1[h]	the first antenna extends in a direction substantially parallel to the first side;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher meets 1[h] because antenna 320 (first antenna) is "mounted to the metal support frame 355… substantially parallel to the plane, or along the plane, of the metal support frame 355," as shown in Figure 3 (annotated detail below). Gaucher, [0025], Fig. 3. Antenna 320 has a long axis that, when the antenna is so mounted, is disposed substantially parallel to the right-short side (first side) of metal support frame 355 (e.g., ground plane, Limitation 1[a]-1[b]), thus meeting Limitation 1[h]. Gaucher, [0025], Fig. 3.

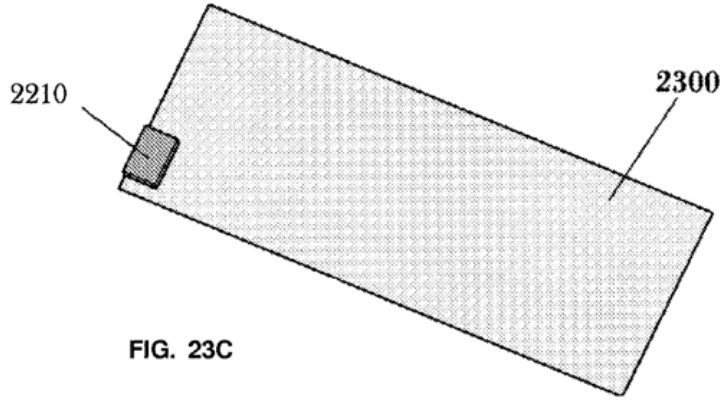
Fractus Exhibit 2003
Fractus v. Geotab
Page 328 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		
1[i]	the second antenna extends in a direction substantially parallel to the second side;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher meets 1[i] because antenna 310 (second antenna) is "mounted to the metal support frame 355…substantially parallel to the plane, or along the plane, of the metal support frame 355," as shown in Figure 3 (annotated detail below). Gaucher, [0025], Fig. 3. Like antenna 320, antenna 310 has a long axis that, when mounted to metal support 355 as shown in Figure 3 and described in Gaucher, is disposed substantially parallel to the top-long side (second side) of support 355 (ground plane, Limitation 1[a]-1[b]), thus meeting Limitation 1[i]. Gaucher, [0025], Fig. 3.

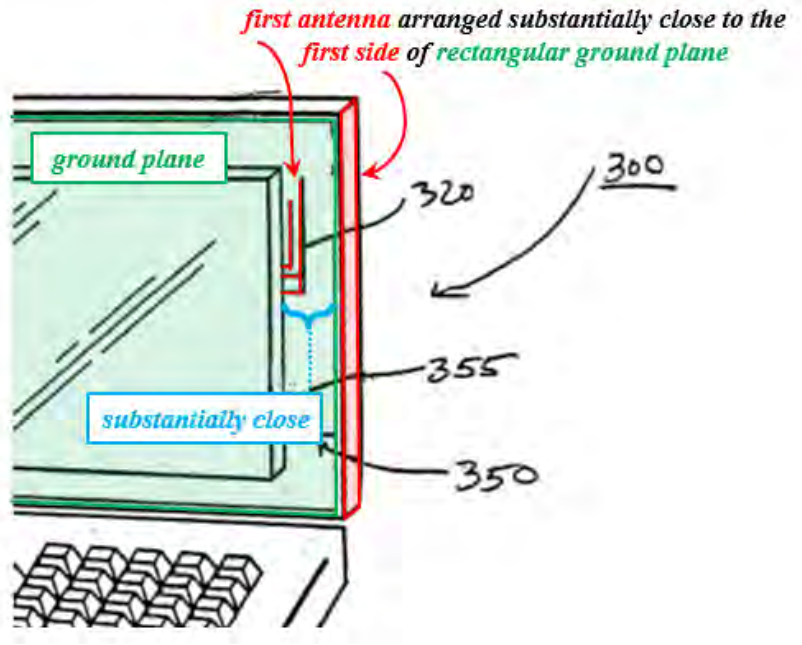
Fractus Exhibit 2003
Fractus v. Geotab
Page 329 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		
1[j]	the first antenna is arranged substantially close to the first side; and	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, The ’458 specification describes “component 2210” as “substantially close to a corner” of a “shorter edge[] of PCB 2300[.]” ’458 Patent, 23:45-52. The ’458 patent never identifies Figure 23C as drawn to scale or quantifies a measurement for “substantially close.”

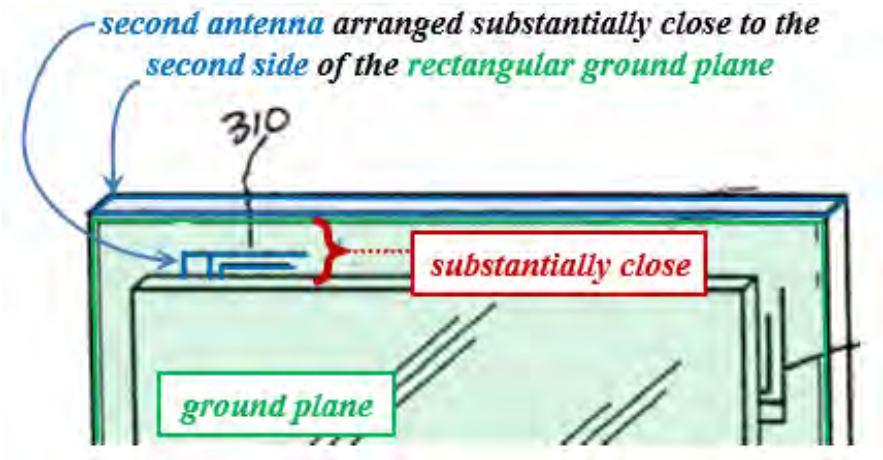
Fractus Exhibit 2003
Fractus v. Geotab
Page 330 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		 FIG. 23C Gaucher meets 1[j] because antenna 320 (first antenna) is "embedded… on a laptop display unit" by being "mounted to the metal support frame 355" between the edge of the display and the right side (first side) of the support frame, as shown in Figure 3 (annotated detail below). Gaucher, [0025], Fig. 3.

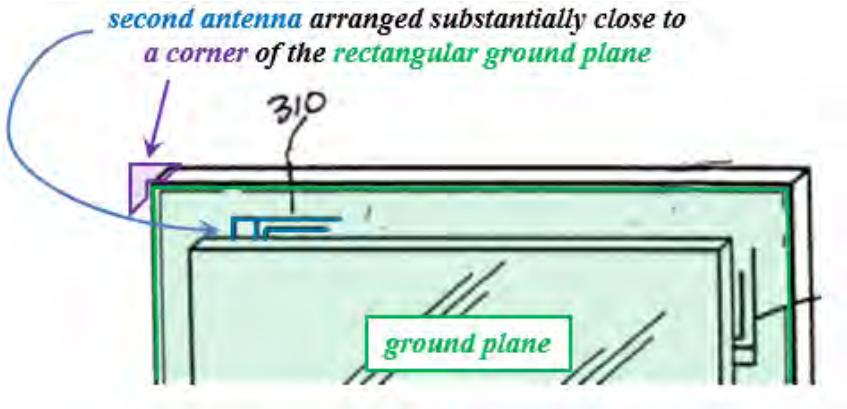
Fractus Exhibit 2003
Fractus v. Geotab
Page 331 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher teaches that its antenna 310 (i.e., the second antenna) and antenna 320 (i.e., the first antenna) are both "embedded antennas on a laptop display unit" by being "mounted on the support frame 355 of the laptop display unit 350." Gaucher, [0025], Fig. 3. Since Gaucher's antennas are both "embedded" on the support frame, they are both "located internally within the wireless handheld or portable device."

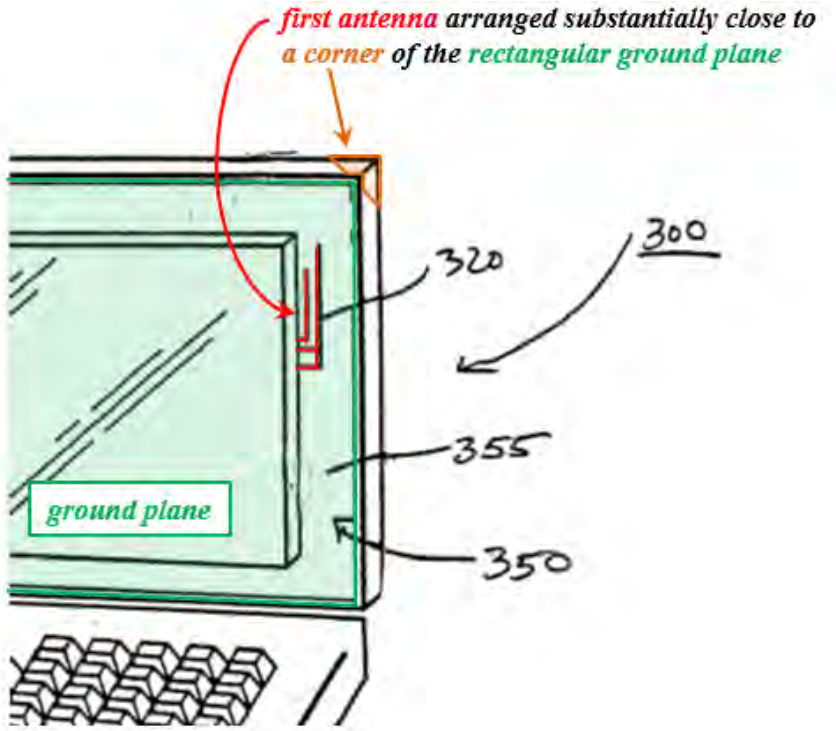
Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
	Claim 2	
2	The wireless handheld or portable device according to claim 1, wherein the second antenna is arranged substantially close to the second side.	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, The '458 specification never quantifies "substantially close." Gaucher meets claim 2 because, antenna 310 is "embedded… on a laptop display unit" by being "mounted to the metal support frame 355" between the display's top edge and the top-edge (second side) of the support frame, "[a]s shown in Figure 3" (annotated detail below). Gaucher, [0025], Fig. 3. 
	Claim 3	

Fractus Exhibit 2003
Fractus v. Geotab
Page 333 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially close to a corner of the rectangular area.	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, The '458 patent never quantifies "substantially close." Gaucher's antenna 310 is shown in Figure 3 as mounted substantially close to the second side (e.g., top side) of support frame 355 (defining a ground plane rectangle). Gaucher, [0025], [0030], [0032], Fig. 3; Claim 2. Gaucher's Figure 3 (annotated detail below) depicts antenna 310 arranged substantially close to the top-left corner of support frame 355's rectangular area. 
Claim 4		
4	The wireless handheld or portable device according to claim 1, wherein the first antenna is arranged	Gaucher expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 334 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
	substantially close to a corner of the rectangular area.	The ’458 patent never quantifies “substantially close.” Gaucher’s antenna 320 is shown in Figure 3 as mounted substantially close to the first side (e.g., right side) of support frame 355 (defining a ground plane rectangle). Gaucher, [0025], [0030], [0032], Fig. 3; Claim 1[i]. Gaucher’s Figure 3 (annotated detail below), antenna 320 is arranged substantially close to the top-right corner of support frame 355’s rectangular area. 
	Claim 7	

Fractus Exhibit 2003
Fractus v. Geotab
Page 335 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
7	The wireless handheld or portable device according to claim 1, wherein the at least one frequency band used for wireless connectivity services corresponds to at least one wireless connectivity service selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher848's tri-band antenna "operate[s] in the 2.4-2.5 GHz, 5.15-5.35 GHz and 5.47-5.85 GHz bands." Gaucher, [0030], [0024], [0026]; Gaucher848, [0008]-[0009], [0011], [0056], Figs. 9, 10. At least IEEE Std. 802.11b, IEEE Std. 802.11g, Bluetooth, and Zigbee each use the 2.4 GHz ISM band (2400-2500 MHz). IEEE Std 802.11b-1999, Pt. 11, pg. 41, 49-51; IEEE Std. 802.11g (2003), pg. 15; Zigbee Alliance, Specification Document (June 27, 2005), pg. 17; Specification of the Bluetooth System, Vol. 2 (Nov. 4, 2004), 27-29; '458 Patent, 2:16-20, 9:46-60. At least IEEE Std. 802.11a uses the "5.15–5.25, 5.25–5.35 and 5.725–5.825 GHz unlicensed national information infrastructure (U-NII) bands" Claim 1[e])); IEEE Std 802.11a-1999, Pt. 11, pg. 3-4, each of which is supported by Gaucher848's tri-band antenna. Gaucher848, [0011]. WLAN networks based on IEEE Std 802.11 (including, e.g., 802.11a, 802.11b, 802.11g) are known as "Wi-Fi." Wi-Fi Celebrates its Third Birthday, Wi-Fi Alliance (Apr. 7, 2003). Gaucher thus separately meets claim 7 for at least each of these "wireless connectivity services" (e.g., 802.11a, 802.11b, 802.11g, WLAN, Wi-Fi, Bluetooth, Zigbee). '458 Patent, 2:16 20, 9:46-60 (describing using the 2.4 GHz ISM band for wireless connectivity services like WLAN, IEEE 802.11b, and Bluetooth).
Claim 8		
8[pre]	A portable device comprising:	To the extent the preamble is limiting, Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[pre].

Fractus Exhibit 2003
Fractus v. Geotab
Page 336 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
8[a]	a ground plane;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[a].
8[b]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[d].
8[c]	the at least three frequency bands being used for mobile communication services;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[e].
8[d]	a second antenna configured to operate in at least one frequency band;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher meets [8.d] because antenna 310 (Gaucher848's tri-band antenna) operates in at least one frequency band, e.g., "operate[s] in the 2.4-2.5 GHz, 5.15-5.35 GHz and 5.47-5.85 GHz bands." Gaucher, [0030], [0024] (incorporating Gaucher848 by reference); Gaucher848, [0008]-[0009], [0011], [0041], [0056], Figs. 9, 10; IEEE Std 802.11a-1999, Pt. 11, pg. 3; IEEE Std 802.11b-1999, Pt. 11, pp., 41, 51; *see also* Claim [1[f].

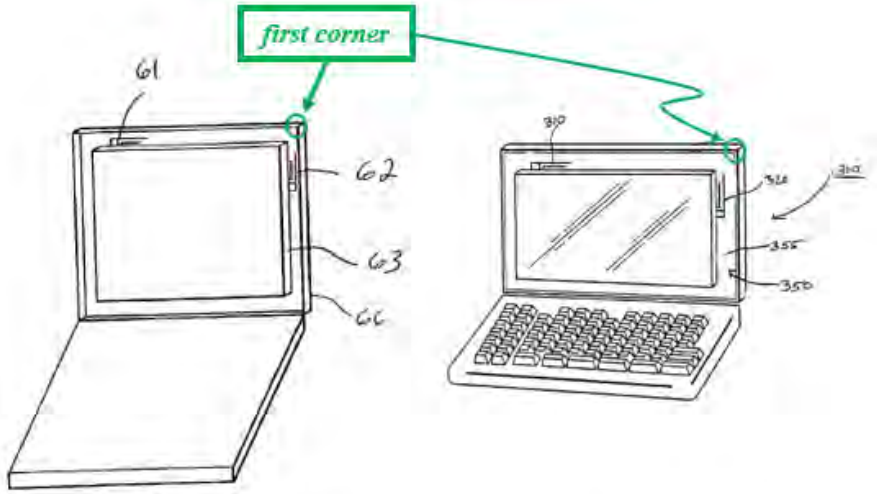
Fractus Exhibit 2003
Fractus v. Geotab
Page 337 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
8[e]	the first antenna extends in a direction substantially parallel to a first side of the portable device;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, As FIG. 3 shows, antenna 320 is disposed with a long axis "substantially parallel" to a first side of laptop 300's support frame 355. Gaucher, [0025] ("antennas 310, 320 are mounted to the metal support frame 355, wherein the plane of each…is substantially parallel to the plane, or along the plane, of the metal support frame 355."), [0032], Fig. 3. Figure 3 further shows that the "first side" of support frame 355—and the long axis of antenna 320 when so mounted—is also substantially parallel to the first side of Gaucher's laptop (portable device). Gaucher, Fig. 3.
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Figure 3 shows support frame 355 supporting a rectangular display where the second side of the frame is longer than the first side. Gaucher, [0025], [0032], Fig. 3; Asano, [0083]; New IBM ThinkPad T42 notebooks feature new fingerprint and Intel PRO/Wireless Technologies pg. 7, Jan. 11, 2005. Thus, Figure 3 shows the same relationship for the laptop lid containing the display frame, wherein the top-side (second side) is longer than the right-side (first side).
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Figure 3 shows that antenna 320 (first antenna) is disposed "substantially close" to a "first side" of frame 355. Gaucher, Fig. 3. Figure 3 further shows that the "first side" of frame 355 extends to

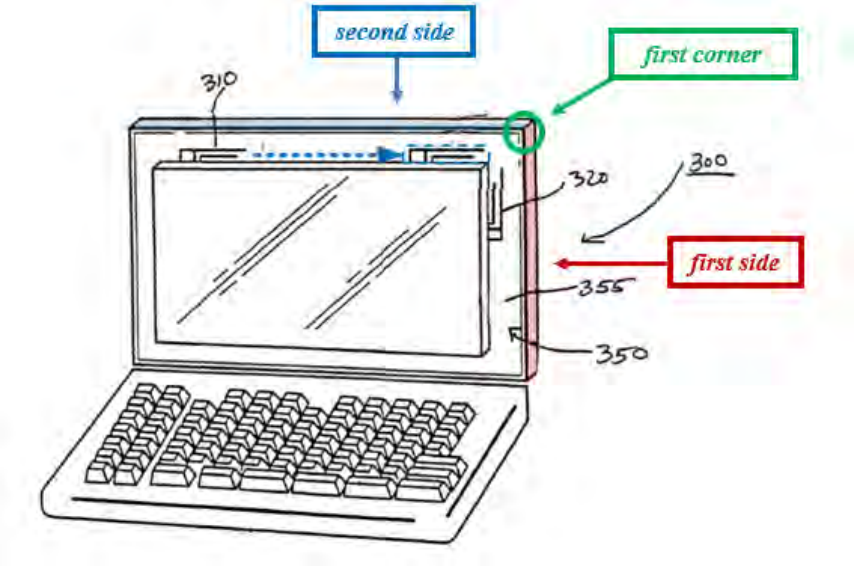
Fractus Exhibit 2003
Fractus v. Geotab
Page 338 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		the "first side" of the laptop lid, so that antenna 320 is also disposed substantially close to the first side of laptop 300 (e.g., portable device). Gaucher, [0025], [0032], Fig. 3.
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher's Figure 3 shows that antenna 310 (the second antenna) is arranged substantially close to the top-left corner of support frame 355's rectangular area. Figure 3 also shows that frame 355 extends to edge—and each corner—of the laptop cover, e.g., "corner of the portable device." Gaucher, Fig. 3. Antenna 310 is implemented using Gaucher848's tri-band antenna. POSAs would have known that antenna 310 could be disposed "substantially close" to the top-right corner of the laptop display, which is also a corner of "the portable device." Gaucher848 explains that the tri-band antenna mounted on the top-side of the support frame is not limited to a left-side-placement, but can also "be located on the right side of the upper portion of the frame (63) (as opposed to the left side of the upper portion of the frame as shown)." Gaucher848, [0049], *cf*. Fig. 6(a) (showing a similar laptop/antenna configuration as Gaucher's Figure 3 with antenna 61 on "left side").

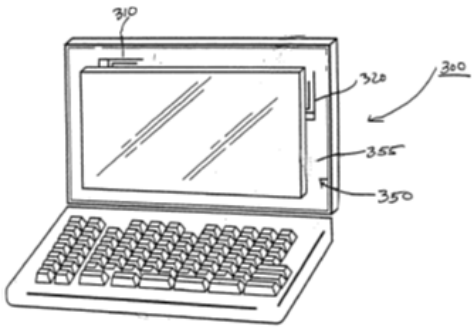
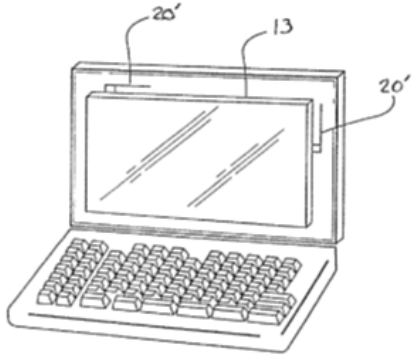
Fractus Exhibit 2003
Fractus v. Geotab
Page 339 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		 Gaucher848, Fig. 6(a) Gaucher, Fig. 3 Thus, rearranging antenna 310 (second antenna) in Gaucher's Figure 3 from the upper-left portion to the upper-right portion of support frame 355, as Gaucher848 specifically teaches as an option for its tri-band antenna, is the second antenna… arranged substantially close to the top-right corner of the portable device.
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, As shown in Figure 3, laptop 300 (portable device) has a first side—the lid's right side—and a second side—the lid's top side. This conforms to the first/second side of frame 355; the first side is the right side where Gaucher's antenna 320 is located, while the second side is the upper-side, as

Fractus Exhibit 2003
Fractus v. Geotab
Page 340 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		Figure 3 shows that frame 355 has sides coterminous with the laptop (e.g., portable device) sides. Gaucher, Fig. 3; Gaucher848, [0049].  The laptop's "first corner" is the top right corner as shown in Figure 3, which coincides with the right corner of upper-side (i.e., the second side) of support frame 355 when Gaucher's antenna 310 is implemented as Gaucher848's tri-band antenna and located on the upper-right portion of the support frame, as taught in Gaucher848. Gaucher848, [0049].
8[j]	the first antenna and the second antenna are located internally within the portable device.	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Claim 1[k].

Fractus Exhibit 2003
Fractus v. Geotab
Page 341 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
	Claim 9	
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.	Gaucher expressly or inherently discloses this claim element. *See, e.g.*, Gaucher teaches that first antenna 320 is "mounted to the metal support frame 355… substantially parallel to the plane, or along the plane, of the metal support frame 355." Gaucher, [0025], Fig. 3. Gaucher also incorporates-by-reference Application No. 09/876,557 (published as Asano (EX1024)) describing a laptop embodiment with two inverted-F antennas "disposed in the plane of the display" like Gaucher's laptop. Gaucher, [0024]-[0025], Fig. 3; Asano, [0058], Fig. 3E.  **Gaucher, Fig. 3**  **Asano, Fig. 3E**

Fractus Exhibit 2003
Fractus v. Geotab
Page 342 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
	Claim 11	
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	Gaucher expressly or inherently discloses this claim element. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. ***See, e.g.***, Sato at [0040] – [0041]: "The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch." ***See also, e.g.***, Talvitie at [0022], [0024], [0026], [0037]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 343 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Gaucher
		"FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120, and a second radiator 130." "the groove plane antenna is configured to radiate at least within one lower frequency range and within one or more higher frequency ranges…" "An example of a multifrequency mobile station configured to support MGSP 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges." "It is also possible to configure all GSM functionalities in one antenna A1 and, similarly, all WCDMA functionalities (transmission and reception) in another antenna A2 by means of a duplex filter…the strong isolation between the antennas reduces power losses between the antennas in such a configuration as well; this, again, preferably cuts down thermal losses and power consumption of the mobile station."

Fractus Exhibit 2003
Fractus v. Geotab
Page 344 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2 BASED ON U.S. PATENT APP. PUB. NO. 2009/0002248 TO ZHAO ET AL. ("ZHAO")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of the asserted claims. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1], particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

U.S. Patent App. Pub. No. 2009/0002248 to Zhao et al. ("Zhao") was filed on October 13, 2004, published on January 1, 2009. This published patent application is prior art under at least 35 U.S.C. § 102(a), (b), (e), or (g)(2) and 103(a). As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Zhao.

To the extent that Zhao is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Zhao alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Pub. No. 2004/0113848 to Gaucher et al. ("Gaucher848")
- U.S. Patent App. Pub. No. 2002/0021250 to Asano et al. ("Asano")

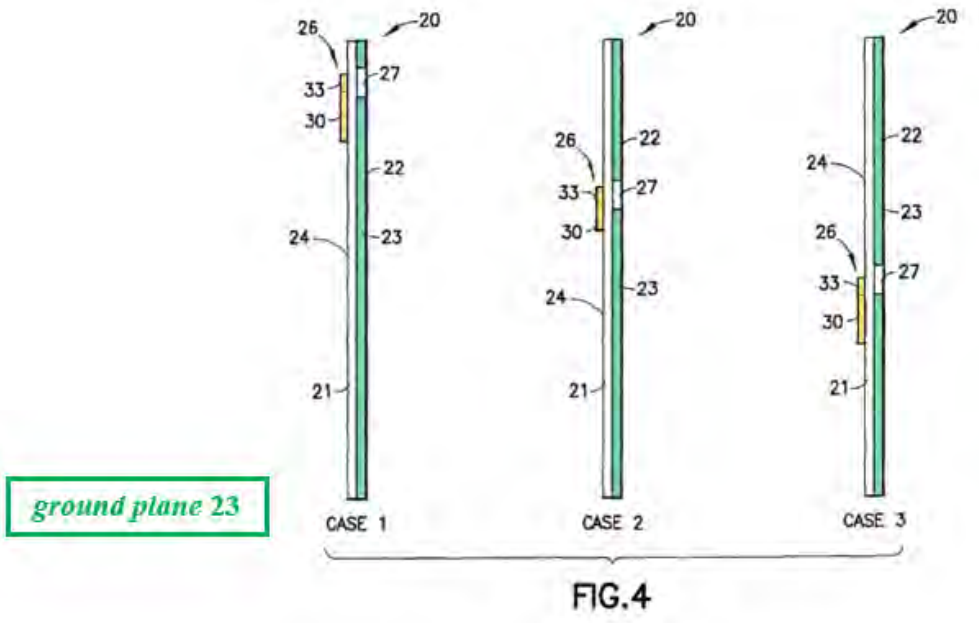
These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants reserve the right to update their constructions and contentions in view of this Court's claim construction order.[2]

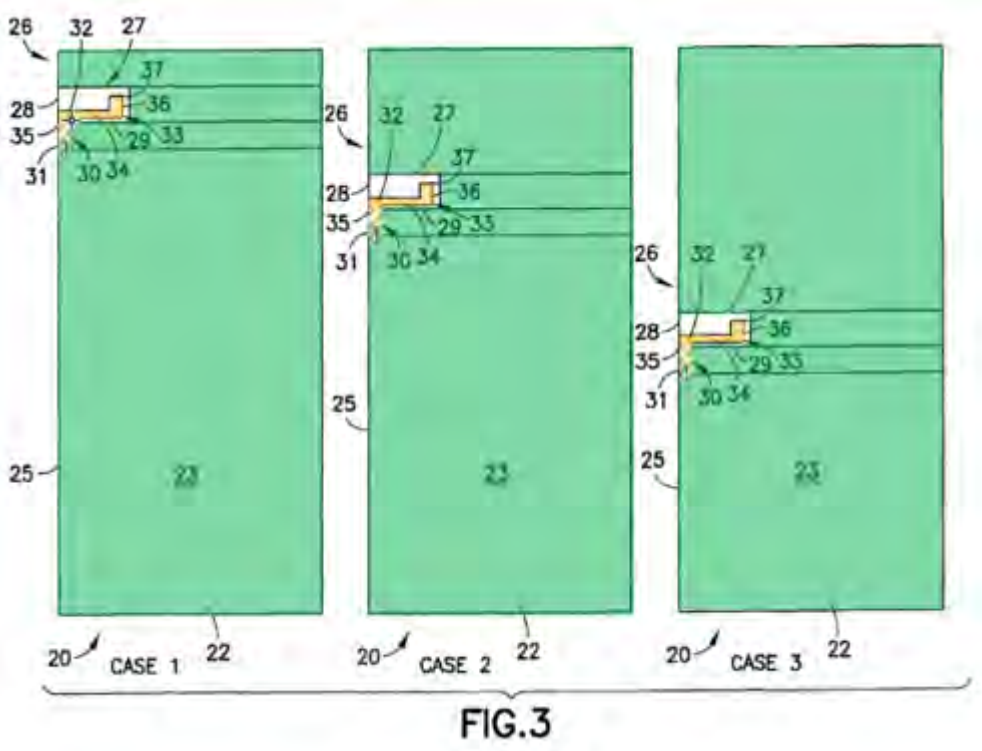
[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, 16, and 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.
[2] Defendants incorporate herein any related work performed by or on behalf of an author or an inventor in the United States under pre-AIA 35 U.S.C. § 102(g)(2). Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

Fractus Exhibit 2003
Fractus v. Geotab
Page 345 of 563

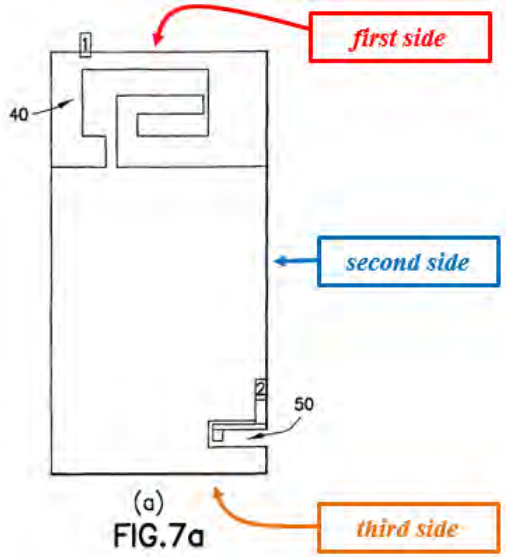
Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
Claim 14		
14[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao describes wireless ultra-wideband ("UWB") communication systems comprising a UWB antenna "for mobile terminals" integrated on a PCB with dimensions consistent with conventional wireless handheld devices. Zhao, code (54), [0002] (describing "UWB-equipped mobile devices"), [0004] (describing UWB designs for mobile terminals comprising mobile handsets), [0007], [0031]-[0032] (describing "a quarter-wavelength slot UWB antenna integrated on a PCB of a mobile terminal"), [0038] (describing UWB slot antenna integrated on 80 mm x 40 mm PCB); Novel Microstrip-Monopole-Integrated Ultra-Wideband Antenna For Mobile UWB Devices, pg. 87 (2003) (describing UWB antenna "for mobile UWB devices") (cited in Zhao, [0004]). POSAs would have had reasons to use Zhao's UWB antenna and PCB in a wireless handheld or portable device because Zhao describes such technology as "provid[ing] a clear added-value benefit to the mobile phone industry by developing UWB-equipped mobile devices." Zhao, [0002].
14[a]	a ground plane;	Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao describes integrating a UWB antenna "on a PCB of a mobile terminal." E.g., Zhao, [0031], [0032], [0038]. Zhao simultaneously describes integrating slot UWB antennas "on a ground plane" with 80mm×40mm×1mm dimensions, "which is the size of a typical PCB for a mobile terminal." Zhao, [0038]. In short, Zhao integrated its antennas on a PCB comprising a dielectric material 21 (e.g., FR4 in [0038]) and an "electrically conducting layer" 23). E.g., Zhao, [0042].

Fractus Exhibit 2003
Fractus v. Geotab
Page 346 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		Figure 3 (annotated below) shows a planar view of the PCB surface comprising the "electrically conducting layer[] 23" (e.g., ground plane). Zhao, Fig. 3, [0042]. Hash marks in annotated Figure 3 below show where the ground plane extends over the region where the slot antenna feed line 30 (with proximal end 31) is positioned on dielectric 21 on the opposing PCB side. Zhao, Fig. 3, [0042]. Figure 4 shows a profile view of PCB 20 comprising "electrically conducting layer[] 23," having rectangular slot 27 (for the slot antenna). Zhao, Figs. 3-4 (annotated below), [0042].  FIG.4

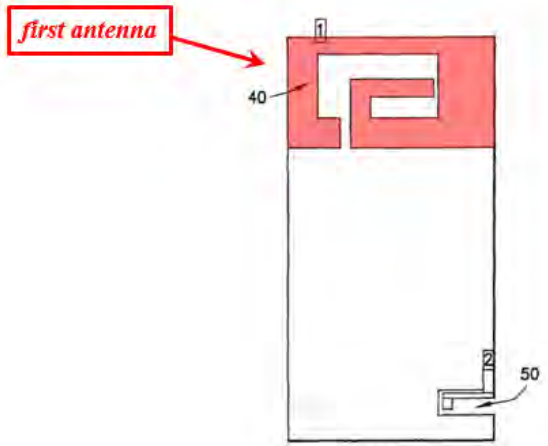
Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		 FIG.3 POSAs would have understood that Zhao's electrically conducting layer is a ground plane because it is the only conductive layer that Zhao identifies on the PCB; it has the rectangular dimensions of the PCB as Zhao describes ([0038]); and it was conventional to dispose a ground plane on a surface of a PCB as shown in Figures 3-4.
14[b]	the ground plane is inscribed in a first rectangular area	Zhao expressly or inherently discloses this claim element.

Fractus Exhibit 2003
Fractus v. Geotab
Page 348 of 563

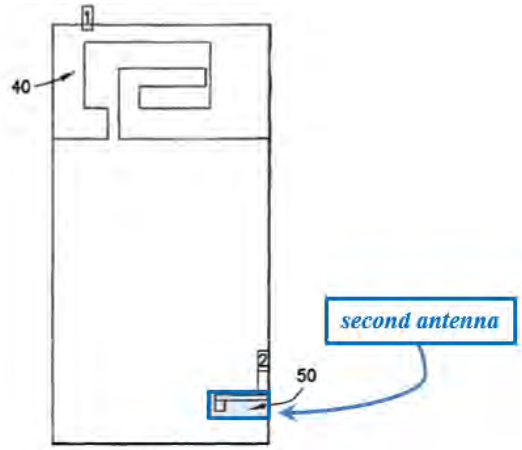
Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
	comprising a first side, a second side and a third side,	*See, e.g.*, The electrically conducting layer (ground plane) has a rectangular area with length 80 mm (e.g., on a second side) and width 40 mm (e.g., on a first and third side). Zhao, [0038]. Herein the "sides" are defined by reference to the planar view of PCB 20 in Figure 7a. The 80 mm length is greater than the 40 mm width. A POSA would have understood that the ground plane "is inscribed in a first rectangular area" because the ground plane is bounded/enclosed by a rectangle having the PCB's dimensions. Zhao, [0038]; '458 Patent, 10:38-42 (describing "the smallest rectangle in which the radiating element of the antenna can be inscribed"); Mathematics Dictionary, Fifth Ed., James/James, pg. 220 (1992) (defining "inscribed"). 
14[c]	a length of the second side being greater than a length of	Zhao expressly or inherently discloses this claim element.

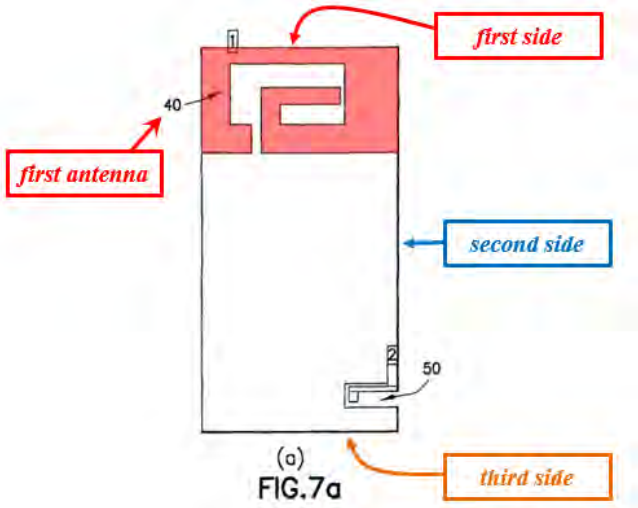
Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
	the first side and a length of the third side;	*See* Claim 1[b].
14[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least two frequency bands;	Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao describes a mobile terminal using a dual-band PIFA [planar inverted-F antenna] antenna 40 (i.e., a first antenna) that operates in the GSM900 and GSM1800 frequency bands. Zhao, Fig. 7a (annotated below); [0044] (antenna 40 is "a conventional dual band PIFA GSM antenna (working at frequencies of 0.9 GHz and 1.8 GHz)"); [0046] ("The location[] of the dual-band PIFA antenna 40… [is] shown in FIG. 7a[.]"). POSAs would have understood that the PIFA GSM antenna works (is "configured to transmit and receive") in the GSM900 and GSM1800 frequency bands. Zhao, Fig. 7b, [0044]; Digital cellular communications system (Phase 2+); Radio Transmission and Reception (3GPP TS 45.005 version 4.3.0 Release 4), pg. 9 (April 2001); *see also* '458 Patent, 2:4-10 (describing exemplary bands for mobile communication services), 9:26-43 (similar).

Fractus Exhibit 2003
Fractus v. Geotab
Page 350 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		 (a) FIG.7a
14[e]	the at least two frequency bands being used for mobile communication services;	Zhao expressly or inherently discloses this claim element. *See* Claim 14[d].
14[f]	a second antenna configured to operate in at least one frequency band;	Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao's mobile terminal includes a "quarter-wavelength slot UWB antenna 50" (i.e., a second antenna). Zhao, [0046] ("The location[] of… the quarter-wavelength slot UWB antenna 50 [is] shown in FIG. 7a[.]"), Fig. 7a (annotated detail below).

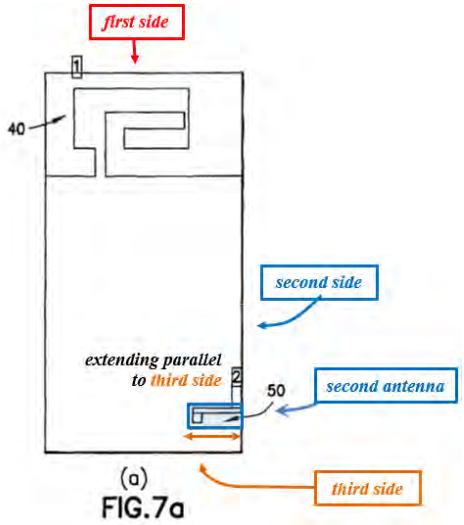
Fractus Exhibit 2003
Fractus v. Geotab
Page 351 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		 (a) FIG.7a Antenna 50 "operate[s] in the frequency range of 3.1 GHz to 4.9 GHz," which covers ultra-wideband (UWB) frequencies for "higher-data-rate communication links" like video and audio data transmissions. Zhao, Fig. 5, [0002], [0038], [0043]; see also id., Fig. 7b (showing antenna 50 return loss S22). Claim 17 depends from claim 14 and recites that the "at least one frequency band" includes "UWB" frequency bands. '458 Patent, 26:41-46. Thus, Zhao's antenna 50 is "a second antenna configured to operate in at least one frequency band" as claimed.
14[g]	the at least one frequency band being different from the at least two frequency bands;	Zhao expressly or inherently discloses this claim element. *See, e.g.*,

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		Zhao's UWB band (3.1 GHz to 4.9 GHz), (see Claim 14[f]), is different from the GSM900 (890-960 MHz) and GSM1800 (1710-1880 MHz) bands. See claims [14[d]-14[e].
14[h]	the first antenna extends in a direction substantially parallel to the first side;	Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao's first antenna 40 has a long axis that is disposed substantially parallel—and proximate—to the top edge ("first side") of the mobile terminal PCB and its ground plane as depicted in the planar view in Figure 7a. Zhao, Fig. 7a (annotated detail below), [0044], [0046] ("The location[] of the dual-band PIFA antenna 40… [is] shown in FIG. 7a[.]"). 

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
14[i]	the first antenna is proximate to the first side;	Zhao expressly or inherently discloses this claim element. *See* Claim 14[h].
14[j]	the second antenna extends in a direction substantially parallel to the third side;	Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao's antenna 50 (second antenna) is located proximate to the lower-right corner of the mobile terminal's PCB and its ground plane—and thus proximate to the PCB/ground plane's lower edge (third side) as shown in the planar view of Figure 7a (annotated below) depicting PCB 20 and dielectric 21. Zhao, Figs. 3-4, 7a, [0042] (describing quarter-wavelength UWB slot antenna), [0046] ("The location[] of…the quarter-wavelength slot UWB antenna 50 [is] shown in FIG. 7a…"); see Claim 14[f]. In Figure 7a's planar view depicting the PCB surface with dielectric 21, the PCB's lower side is the third side of the ground plane's rectangular area. See Claim 14[c]. Antenna 50 has a long axis because its largest size is "12.75 mm×4 mm" (id., [0052]), and planar view Figure 7a (showing a planar view of PCB 20 with dielectric 21) shows antenna 50 extending a maximum of 12.75 mm parallel to the third side. Zhao, Fig. 7a; *see also id.*, Fig. 3, [0042].

Fractus Exhibit 2003
Fractus v. Geotab
Page 354 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		 FIG.7a
14[k]	the second antenna is proximate to the third side;	Zhao expressly or inherently discloses this claim element. *See* Claim 1[j].
14[l]	the second antenna is inscribed in a second rectangular area;	Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao's slot antenna 50 ("second antenna") is bounded by (inscribed in) a rectangular area of at most "12.75mm×4 mm," shown as "rectangular slot 27" in planar view Figure 4. Zhao, Fig. 4,

Fractus Exhibit 2003
Fractus v. Geotab
Page 355 of 563

<table>
<tr><th>Claim No.</th><th>U.S. Patent No. 8,810,458 B2</th><th>Zhao</th></tr>
<tr><td></td><td></td><td>[0042], [0052]; see also id., Fig. 7a (annotated detail below), [0046] (“The location[] of… antenna 50 [is] shown in FIG. 7a…”); see Claim 14[i].</td></tr>
<tr><td>14[m]</td><td>a sum of a length and a width of the second rectangular area is smaller than a quarter of an operating wavelength of the second antenna;</td><td>Zhao expressly or inherently discloses this claim element.

See, e.g.,

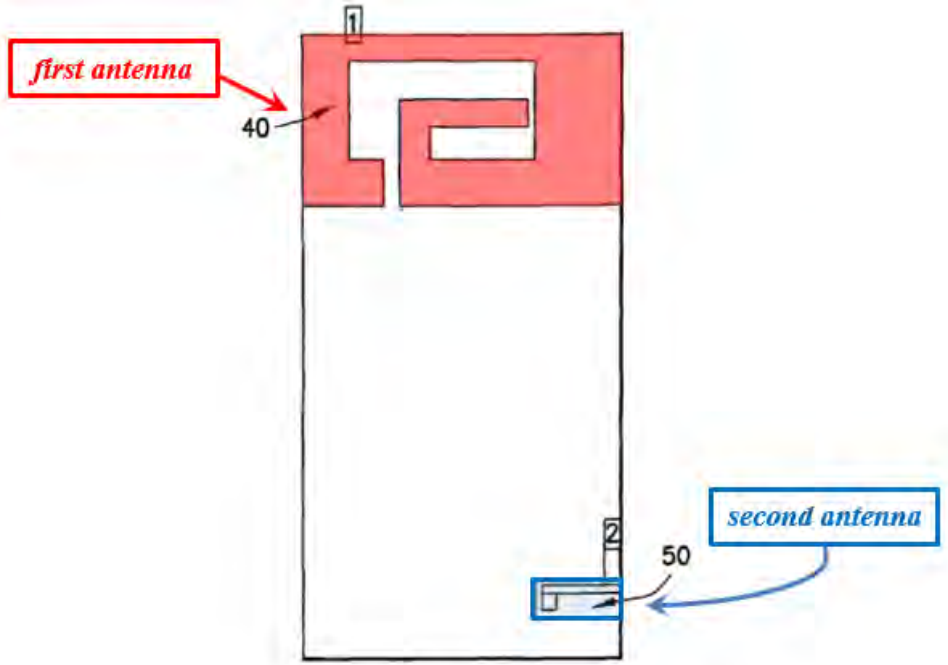
Zhao’s second antenna 50 (a “quarter-wavelength” slot antenna) measures at most “12.75mm×4mm” (Zhao, [0052]), thereby making “a sum of a length and a width of the second rectangular area” at most 16.75 mm. See Claim 14[l].

Zhao’s antenna 50 operates from “3.1 GHz to 4.9 GHz.” Zhao, [0038]; claim [14[g]. Frequency and wavelength are inversely related to each other via the equation $\lambda = \frac{v}{f}$, where ‘λ’ is wavelength, ‘v’ is velocity (i.e., speed of light), and ‘f’ is frequency. EX1027, 15-16; Pozar, ¶219. Based on this equation, antenna 50’s free-space “operating wavelength” for 3.1-4.9 GHz, using the speed of light 3.0×10^8 $(^m/_s)$ $x\ 10^3$ $(^{mm}/_m) = 3.0 \times 10^{11}$ $(^{mm}/_s)$, is between 61 and 97 mm. “”458 Patent, 4:18-26 (antenna segments sized relative to “free-space” operating wavelength), 5:11-16 (“rectangle… longest side… does not exceed [1/20] the longest free-space operating wavelength of the antenna”), 23:3-12 (sizing slots by reference to “free-space operating wavelength”).
<table>
<tr><th>f (Hz)</th><th>wavelength (mm)</th><th>¼ wavelength (mm)</th></tr>
<tr><td>3.1×10^9</td><td>$\left(\frac{3.0 \times 10^{11}}{3.1 \times 10^9}\right) = 0.97 \times 10^2 = 97$</td><td>$^{97}/_4 = 24.25$</td></tr>
<tr><td>4.9×10^9</td><td>$\left(\frac{3.0 \times 10^{11}}{4.9 \times 10^9}\right) = 0.61 \times 10^2 = 61$</td><td>$^{61}/_4 = 15.25$</td></tr>
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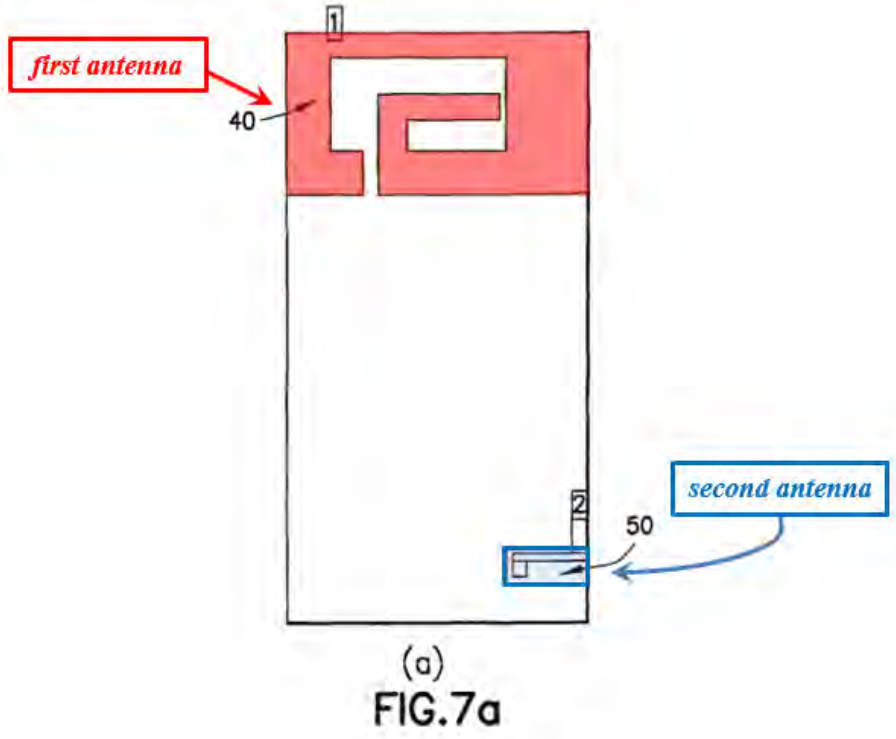
Fractus Exhibit 2003
Fractus v. Geotab
Page 356 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		At 3.1 GHz a quarter of the 97 mm operating wavelength is 24.25 mm. Since 16.75 mm is smaller than "a quarter of an operating wavelength" of second antenna 50 at 3.1 GHz—e.g., 24.25 mm—Zhao's UWB antenna meets 14[m].
14[n]	a geometry of the first antenna being different than a geometry of the second antenna;	Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao's meets 14[n] because its quarter-wave "L-shaped stub" slot antenna 50 (second antenna) has a different geometry than the PIFA antenna 40 (first antenna). Zhao, [0046], [0042], Fig. 7(a) (annotated detail below).

Fractus Exhibit 2003
Fractus v. Geotab
Page 357 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		 (a) FIG.7a
14[o]	at least one of the first antenna and the second antenna is proximate to a corner of the first rectangular area; and	Zhao expressly or inherently discloses this claim element. *See, e.g.*,

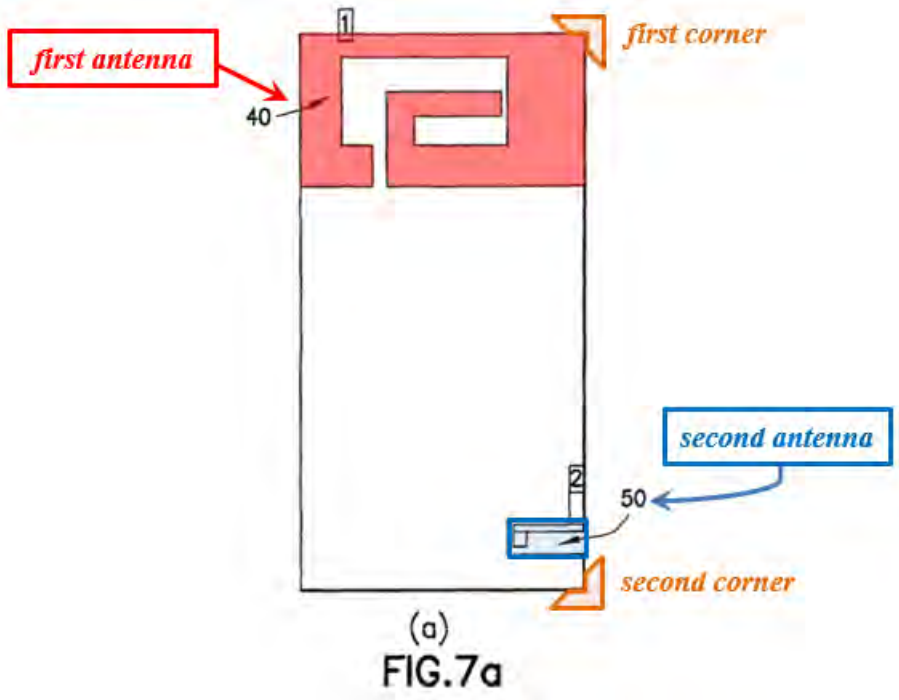
Fractus Exhibit 2003
Fractus v. Geotab
Page 358 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		Zhao meets [14.n] in at least two ways because antenna 40 (first antenna) and antenna 50 (second antenna) are each disposed proximate to a corner of the "rectangular area" that circumscribes the ground plane (and PCB). Zhao, Fig. 7a (annotated detail below); [0046]; see also Claims 14[a]-[b].  (a) FIG.7a
14[p]	the first antenna and the second antenna are located internally	Zhao expressly or inherently discloses this claim element.

Fractus Exhibit 2003
Fractus v. Geotab
Page 359 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
	within the wireless handheld or portable device.	*See, e.g.*, Zhao's antenna 40 (first antenna) is a PIFA [planar inverted F antenna] antenna "located 8 mm above the PCB" of the mobile terminal and antenna 50 (second antenna) is slot antenna disposed in rectangular slot 27 in conductive layer 23 (e.g., the ground plane) on the mobile terminal PCB. Zhao, [0042], [0044], [0046]. POSAs would have disposed the PCB, and the two antennas, "internally within" the wireless mobile terminal ("wireless handheld or portable device") because a mobile device PCB and its electronics were conventionally located internal to the mobile device. See, e.g., U.S. Patent Pub. 2004/0121828; U.S. Patent No. 6,728,555; UK Patent Application GB2336019. POSAs would have had additional reason to place both antennas (and PCB) internally because a mobile device conventionally comprised a housing to protect the PCB, its electronics, and the antennas from external exposure and physical damage. *E.g.*, Gaucher848, [0003]-[0004]; Asano, [0006]. Moreover, POSAs would have understood that Zhao's planar (PIFA) and slot antenna form factors were well-suited to placement within a mobile device housing because their profiles conformed to the PCB profile, e.g., planar and rectangular, which would readily have been located internal to the mobile device.
Claim 15		
15[pre]	The wireless handheld or portable device according to claim 14,	To the extent the preamble is limiting, Zhao expressly or inherently discloses this claim element. As discussed in claims 14[a] and 14[o], Zhao's PCB forms a ground plane defining "the first rectangular area." Zhao, [0038], [0046], Fig. 7a (annotated detail below). Zhao's Figure 7a (annotated detail below) teaches that the first antenna 40 is located above and spans across the upper corners of the PCB and the second antenna 50 is in the bottom-right

Fractus Exhibit 2003
Fractus v. Geotab
Page 360 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
		corner of the PCB, making either of the upper corners "a first corner" and the bottom-right corner "a second corner," as claimed.  (a) FIG.7a As also discussed in Claims 14[a] and 14[o], Zhao teaches that both antennas are "proximate" to their respective upper and lower corners because when placing the antennas on the PCB as Zhao describes "the greatest separation distance" between the antennas provides "the best isolation performance." Zhao, [0049], [0055].

Fractus Exhibit 2003
Fractus v. Geotab
Page 361 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Zhao
15[a]	wherein the first antenna is proximate to a first corner of the first rectangular area and	Zhao expressly or inherently discloses this claim element. *See* Claim 15[pre].
15[b]	the second antenna is proximate to a second corner of the first rectangular area.	Zhao expressly or inherently discloses this claim element. *See* Claim 15[pre].
17	The wireless handheld or portable device according to claim 14, wherein the at least one frequency band is used for a wireless connectivity service selected from the group comprising: Bluetooth™, IEEE802.11a, IEEE802.11b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	Zhao expressly or inherently discloses this claim element. *See, e.g.*, Zhao meets claim 17 because "quarter-wavelength slot UWB antenna 50" / slot antenna 26 (e.g., second antenna) is a UWB antenna that "operat[es] in the frequency range of 3.1 GHz to 4.9 GHz[.]" Zhao, [0002], [0007], [0038], [0042], [0046]; see also Claim 14[f].

Fractus Exhibit 2003
Fractus v. Geotab
Page 362 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2 BASED ON THE HTC TYPHOON ("HTC TYPHOON")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1]. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe the asserted claims, particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

HTC Corporation's ("HTC") HTC Typhoon, including the same product rebranded under other names, including at least the "Audiovox SMT 5600," "Dopod 565," "i-mate SP3," "Krome Intellekt iQ700," Orange SPV C500," Qtek 810," Vitelcom/Moviestar TSM520," and "O2 Xphone llm" as publicly demonstrated, known, offered for sale, sold, and/or used by HTC and/or customers of HTC, including without limitation any known customers of Nokia or otherwise available to the public, including in this country, ("HTC Typhoon") was available to the public no later than December 7, 2004[2], which is prior to the critical date of the '458 patent. Thus, the HTC Typhoon is available as prior art at least under pre-AIA 35 U.S.C. § 102(a)-(b), (g)(2) and 103(a). At least the following documents provide evidence as to the date the HTC Typhoon was "offered for sale or publicly used or known," "the date the offer or use of the item took place or the information became known", and the "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" [3]:

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[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, 16, and 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.

[2] *See* AT&T Wireless Website, Archived December 7, 2004 at: https://web.archive.org/web/20041207142355/http://www.attwireless.com/smallbusiness/products/all_phones.jhtml (last accessed June 11, 2025)

[3] Defendants do not yet have complete information regarding the dates by which this product was publicly disclosed, made, used, sold, or offered for sale, the circumstances under which the research, design, and development activities were conducted, and the identities of the particular individuals involved in such activities. Defendants anticipate that the actual dates, circumstances, and identities of individuals will be the subject of third party discovery during this lawsuit. Defendants therefore reserve the right to amend and/or supplement their Invalidity Contentions and this chart if additional information becomes available during the course of discovery. The date the HTC Typhoon was "offered for sale or publicly used or known," as well as "the date the offer or use of the item took place or the information became known" is at least as early as the dates identified in the published documents. The "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" includes at least those persons associated with the publication(s), press releases, and conference attendees, or other documents associated with each version on the HTC Typhoon. Defendants also reserve the right to rely on the public use, offer for sale, sale, or installation of the devices described in the publications identified herein once Defendants have had a fair opportunity to take discovery on these subjects.

Fractus Exhibit 2003
Fractus v. Geotab
Page 363 of 563

- AT&T Wireless Website, Archived December 7, 2004 at: https://web.archive.org/web/20041207142355/http://www.attwireless.com/smallbusiness/products/all_phones.jhtml (last accessed June 11, 2025)
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "NM8"; Product Code: TP"; Record Option: 3/18 "Detail"; Attachment: "External Photos" (last accessed June 11, 2025) ("FCC External Photos")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "NM8"; Product Code: TP"; Record Option: 3/18 "Detail"; Attachment: "User Manual" (last accessed June 11, 2025) ("FCC User Manual")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "NM8"; Product Code: TP"; Record Option: 3/18 "Detail"; Attachment: "Antenna Information" (last accessed June 11, 2025) ("FCC Antenna Specification")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "NM8"; Product Code: TP"; Record Option: 3/18 "Detail"; Attachment: "Internal Photos" (last accessed June 11, 2025) ("FCC Internal Photos")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "NM8"; Product Code: TP"; Record Option: 3/18 "Detail"; Attachment: "Test Report" (last accessed June 11, 2025) ("FCC Bluetooth Test Report")
- Phonescoop.com, *HTC Typhoon*, https://www.phonescoop.com/phones/phone.php?p=585 (last accessed June 13, 2025)
- PhoneArena.com, *HTC Typhoon*, https://www.phonearena.com/phones/HTC-Typhoon_id870 (last accessed June 13, 2025)
- Phonedb.com, *HTC Typhoon*, https://phonedb.net/index.php?m=device&id=192&c=qtek_8010__htc_typhoon (last accessed June 13, 2025)
- Wikipedia.com, *HTC Typhoon*, https://en.wikipedia.org/wiki/HTC_Typhoon (last accessed June 13, 2025)

As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by HTC Typhoon. To the extent that HTC Typhoon is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of HTC Typhoon alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato")
- U.S. Patent Application Publication No. 2004/0135729 ("Talvitie")

One of ordinary skill in the art, as of the priority date of the '458 Patent, would have known to combine or modify the prior art elements disclosed by the foregoing references using known methods, and to use these elements according to their established functions in order to achieve a known and predictable result.

Fractus Exhibit 2003
Fractus v. Geotab
Page 364 of 563

These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants retain the right to update their constructions and contentions in view of this Court's claim construction order.[4]

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
Claim 1		
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The HTC Typhoon is a wireless handheld or portable device.

[4] Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

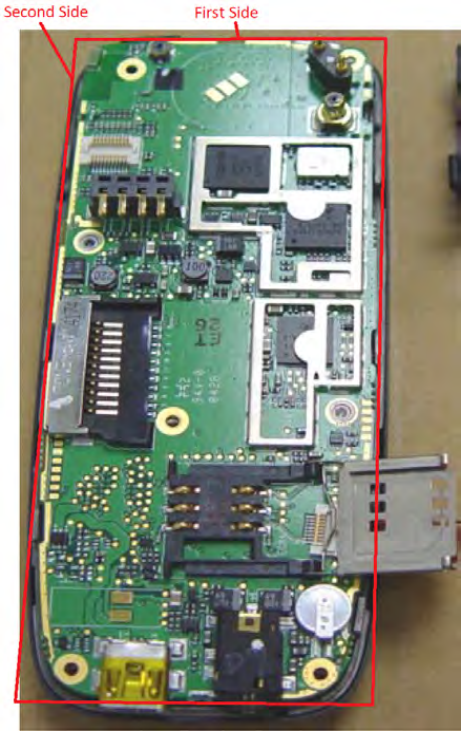
Fractus Exhibit 2003
Fractus v. Geotab
Page 365 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC External Photos at 1.
1[a]	a ground plane;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The HTC Typhoon includes a ground plane.

Fractus Exhibit 2003
Fractus v. Geotab
Page 366 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 2.

Fractus Exhibit 2003
Fractus v. Geotab
Page 367 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
1[b]	the ground plane is inscribed in a rectangular area comprising a first side and a second side,	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The ground plane of the HTC Typhoon is inscribed in a rectangular area (shown in red below) comprising a first side (labeled below) and a second side (labeled below). A length of the second side is greater than a length of the first side. 

Fractus Exhibit 2003
Fractus v. Geotab
Page 368 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		See FCC Internal Photos at 2 (annotated).
1[c]	a length of the second side being greater than a length of the first side;	HTC Typhoon expressly or inherently discloses this claim element. *See* Claim 1[b].
1[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The HTC Typhoon includes a first antenna (cellular antenna, labeled below).

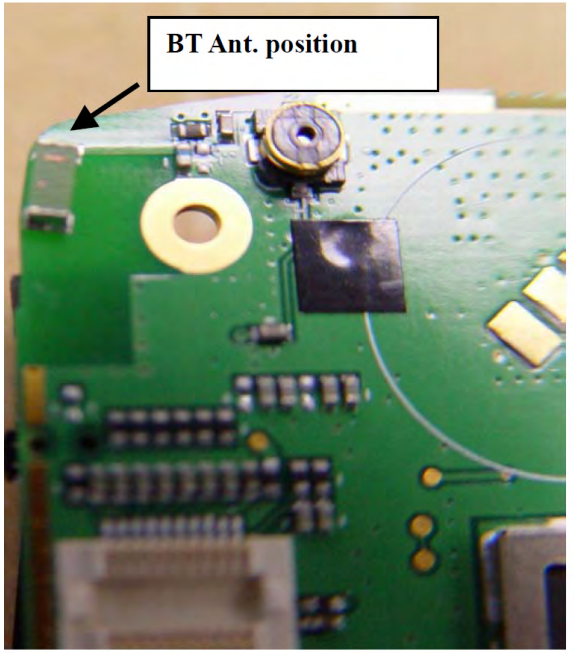
Fractus Exhibit 2003
Fractus v. Geotab
Page 369 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 The first antenna of the HTC Typhoon is configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands:

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		GSM/GPRS Tri-Band Module GSM850 824 ~ 849, 869 ~ 894 MHz DCS1800 1710 ~ 1785, 1805 ~ 1880 MHz DCS1900 1850 ~ 1910, 1930 ~ 1990 MHz *See* FCC User Manual at 189. **1.2 Antenna Configuration** The antenna operates in GSM850, DCS1800, PCS1900 bands, the phone fixture used is shown in Figure 1.  **Figure 1 : Test Fixture** *See* FCC Antenna Specification at 2. The at least three frequency bands are used for GSM mobile communication services.

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
1[e]	the at least three frequency bands being used for mobile communication services;	HTC Typhoon expressly or inherently discloses this claim element. *See* Claim 1[d].
1[f]	a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The HTC Typhoon includes a second antenna (Bluetooth (BT) antenna, labeled below).

Fractus Exhibit 2003
Fractus v. Geotab
Page 372 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 4.
1[g]	the at least one frequency band being used for wireless connectivity services;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the HTC Typhoon is configured to receive electromagnetic waves corresponding to at least one frequency band from 2402 MHz to 2480 MHz: *See* FCC Bluetooth Test Report at 4, 6, 11, 19, 34.

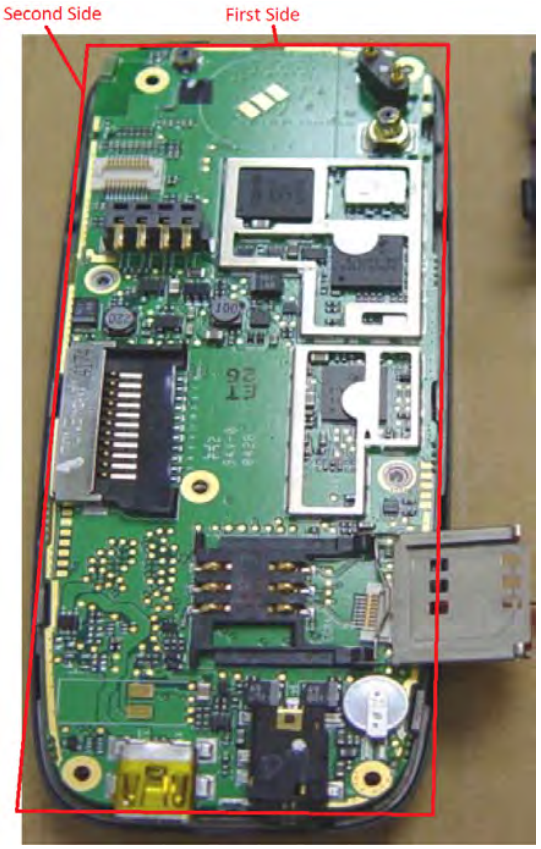
Fractus Exhibit 2003
Fractus v. Geotab
Page 373 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		The at least one frequency band is used for Bluetooth wireless connectivity services. Bluetooth Class 2 transmit power *See* FCC User Manual at 189.
1[h]	the first antenna extends in a direction substantially parallel to the first side;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the HTC Typhoon extends in a direction substantially parallel to the first side.

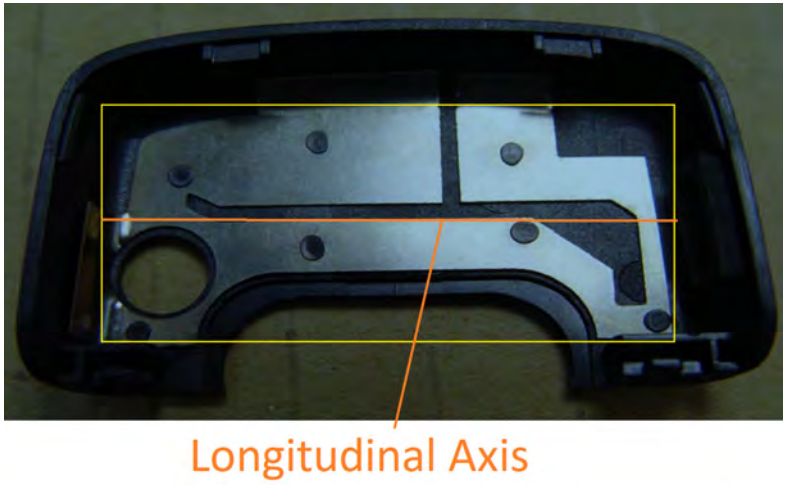
Fractus Exhibit 2003
Fractus v. Geotab
Page 374 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		

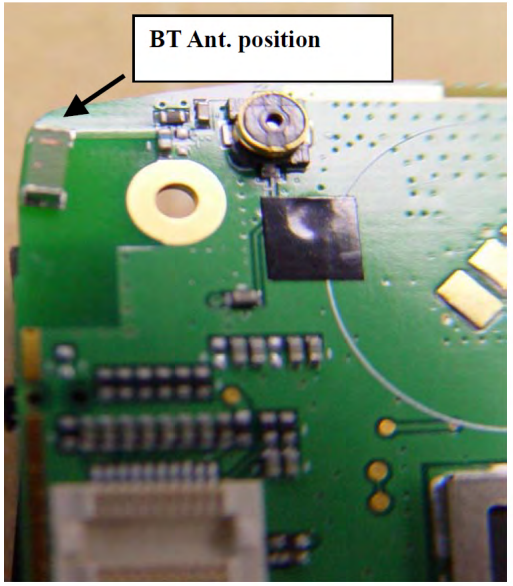
Fractus Exhibit 2003
Fractus v. Geotab
Page 375 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 2 (annotated). The radiating element is inscribed in the yellow rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as an orange line.

Fractus Exhibit 2003
Fractus v. Geotab
Page 376 of 563

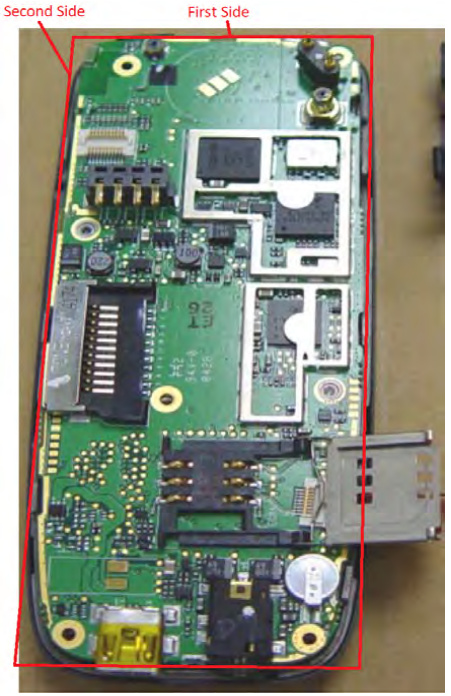
Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 5 (annotated).
1[i]	the second antenna extends in a direction substantially parallel to the second side;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the HTC Typhoon extends in a direction substantially parallel to the second side.

Fractus Exhibit 2003
Fractus v. Geotab
Page 377 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 4. The radiating element of the second antenna is inscribed in the blue rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as a blue line.  *See* FCC Internal Photos at 2 (annotated).

Fractus Exhibit 2003
Fractus v. Geotab
Page 378 of 563

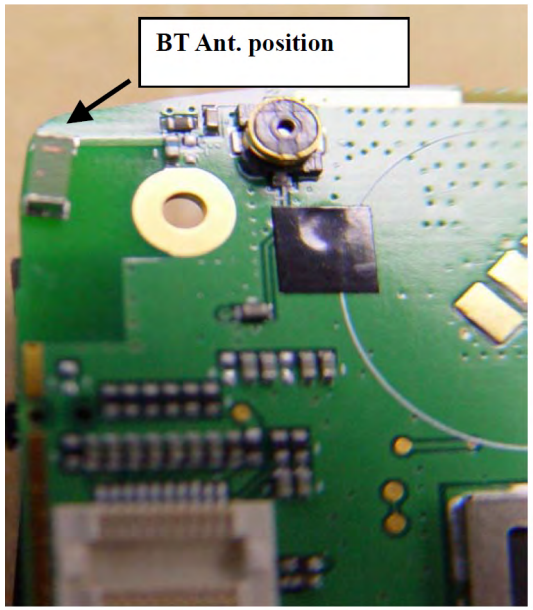
Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
1[j]	the first antenna is arranged substantially close to the first side; and	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the HTC Typhoon is arranged substantially close to the first side. 

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 2 (annotated).
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The first antenna and the second antenna of the HTC Typhoon are located internally within the HTC Typhoon.

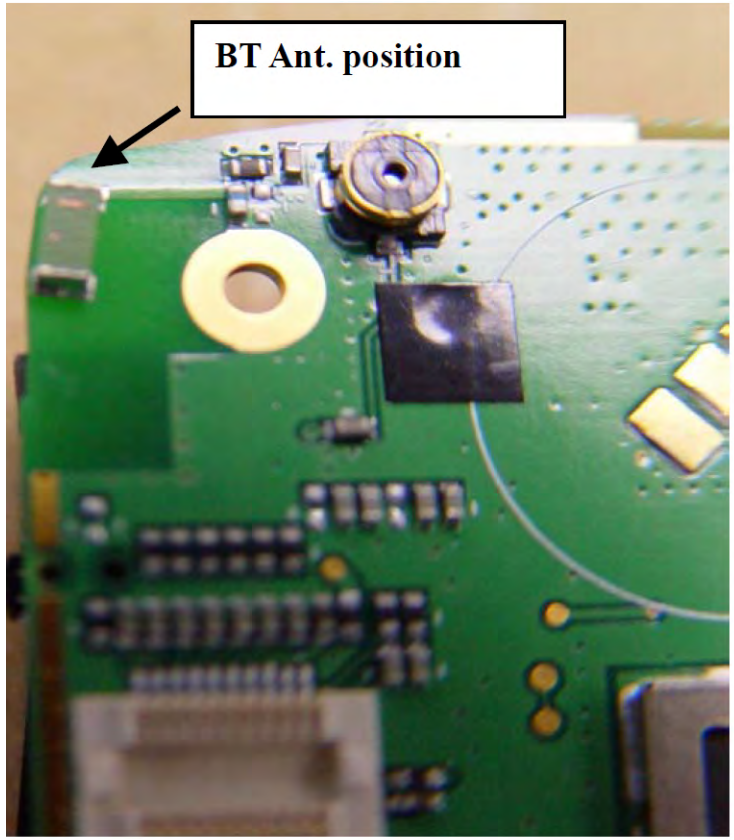
Fractus Exhibit 2003
Fractus v. Geotab
Page 380 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		

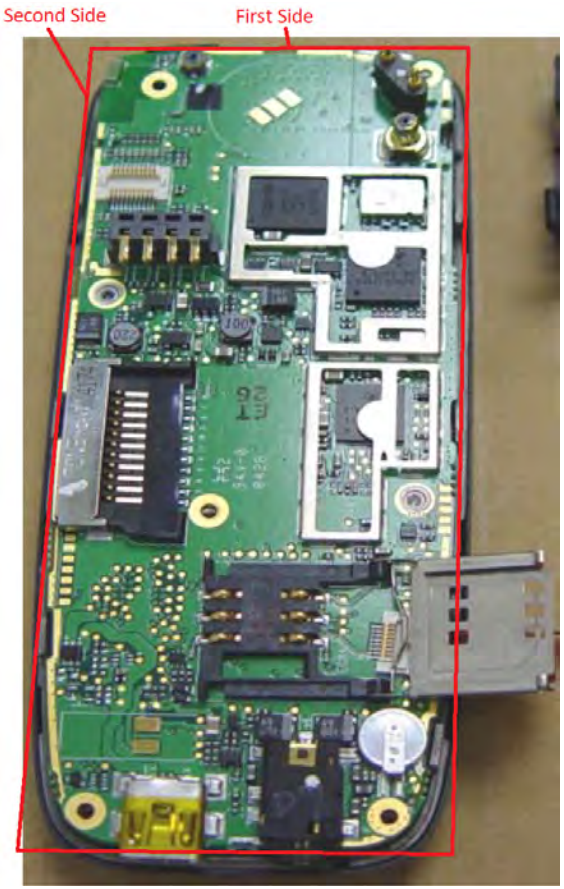
Fractus Exhibit 2003
Fractus v. Geotab
Page 381 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 4.
	Claim 2	
2	The wireless handheld or portable device according to claim 1, wherein the second antenna is arranged substantially close to the second side.	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the HTC Typhoon is arranged substantially close to the second side.

Fractus Exhibit 2003
Fractus v. Geotab
Page 382 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 4.

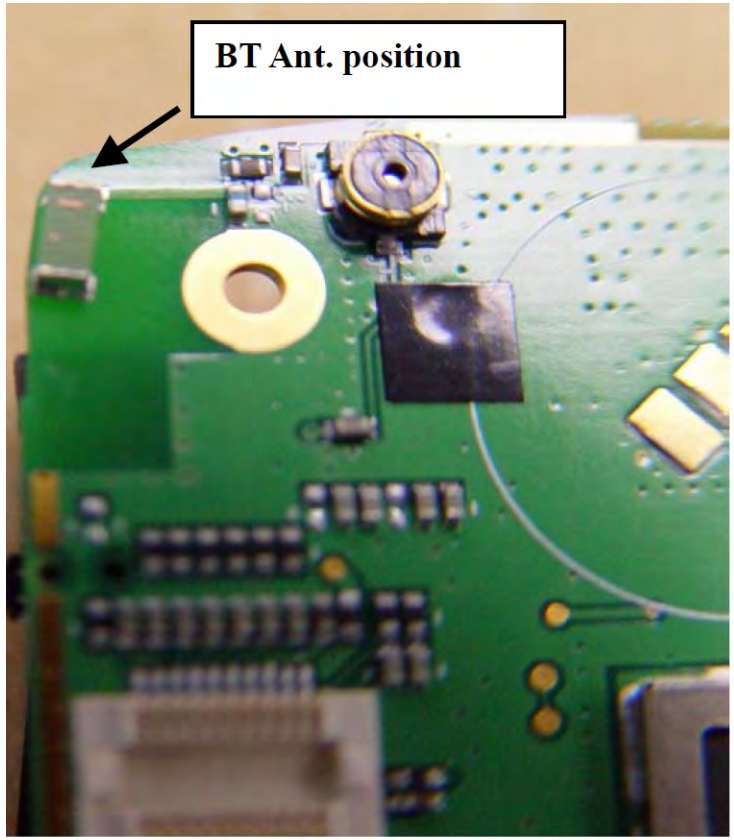
Fractus Exhibit 2003
Fractus v. Geotab
Page 383 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 2 (annotated).

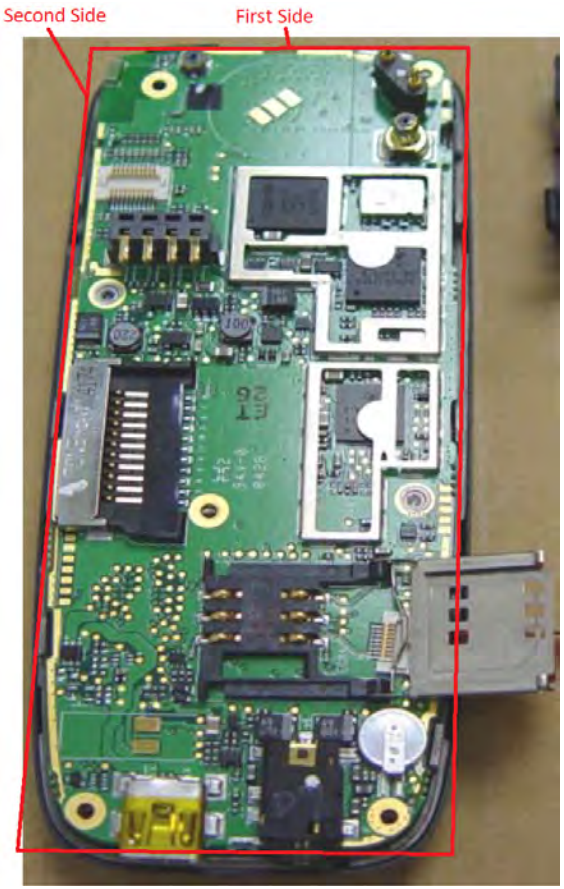
Fractus Exhibit 2003
Fractus v. Geotab
Page 384 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
	Claim 3	
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially close to a corner of the rectangular area.	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the HTC Typhoon is arranged substantially close to a corner of the rectangular area. The second antenna is arranged substantially close to a corner where the first side meets the second side of the rectangular area.

Fractus Exhibit 2003
Fractus v. Geotab
Page 385 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 4.

Fractus Exhibit 2003
Fractus v. Geotab
Page 386 of 563

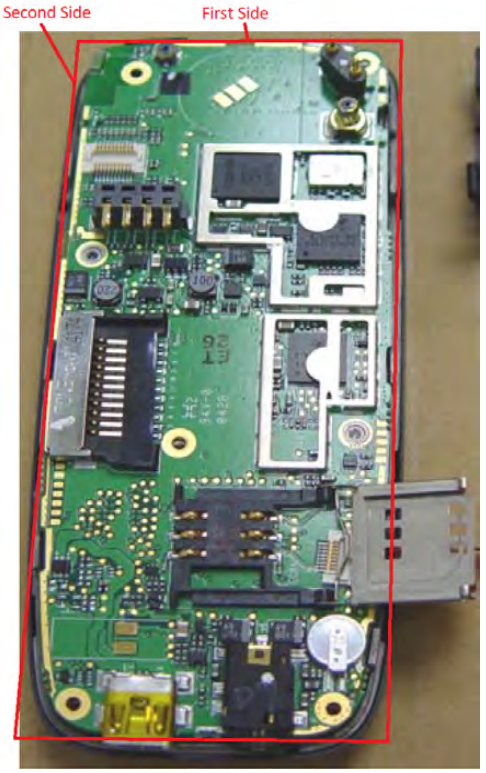
Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 2 (annotated).

Fractus Exhibit 2003
Fractus v. Geotab
Page 387 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
	Claim 4	
4	The wireless handheld or portable device according to claim 1, wherein the first antenna is arranged substantially close to a corner of the rectangular area.	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the HTC Typhoon is arranged substantially close to a corner of the rectangular area. The first antenna is arranged substantially close to corner where the first side meets a side of the rectangular area that is opposite the second side.

Fractus Exhibit 2003
Fractus v. Geotab
Page 388 of 563

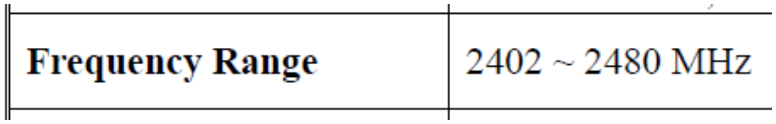
Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 2 (annotated).
	Claim 7	
7	The wireless handheld or portable device according to claim 1, wherein the at least	HTC Typhoon expressly or inherently discloses this claim element.

Fractus Exhibit 2003
Fractus v. Geotab
Page 390 of 563

<table>
<tr><th>Claim No.</th><th>U.S. Patent No. 8,810,458 B2</th><th>HTC Typhoon</th></tr>
<tr><td></td><td>one frequency band used for wireless connectivity services corresponds to at least one wireless connectivity service selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.</td><td>See, e.g.,

In the HTC Typhoon, the at least one frequency band used for wireless connectivity services corresponds to Bluetooth.

See FCC Bluetooth Test Report at 4, 6, 11, 19, 34.

See FCC User Manual at 189.</td></tr>
<tr><td colspan="3">Claim 8</td></tr>
<tr><td>8[pre]</td><td>A portable device comprising:</td><td>To the extent the preamble is limiting, HTC Typhoon expressly or inherently discloses this claim element.

See, e.g.,

The HTC Typhoon is a wireless handheld or portable device.</td></tr>
</table>

Fractus Exhibit 2003
Fractus v. Geotab
Page 391 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC External Photos at 1.
8[a]	a ground plane;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The HTC Typhoon includes a ground plane.

Fractus Exhibit 2003
Fractus v. Geotab
Page 392 of 563

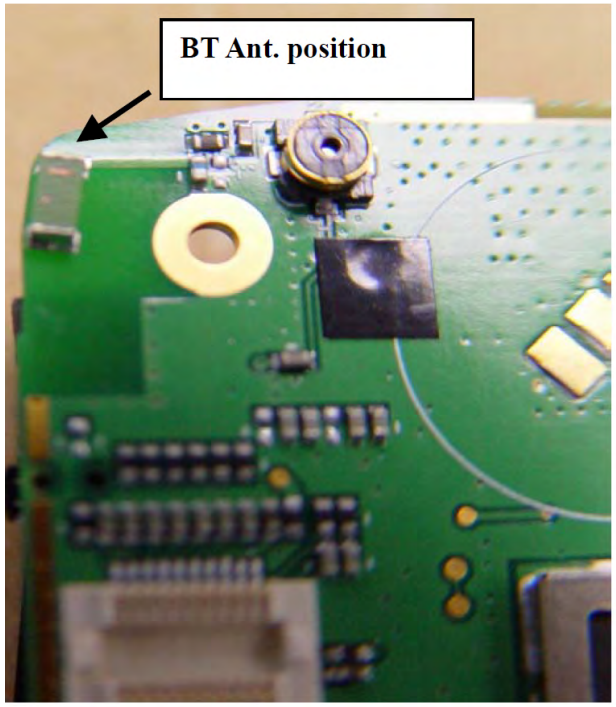
Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 2.
8[b]	a first antenna configured to transmit and receive	HTC Typhoon expressly or inherently discloses this claim element.

Fractus Exhibit 2003
Fractus v. Geotab
Page 393 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
	electromagnetic waves corresponding to at least three frequency bands;	*See, e.g.*, The HTC Typhoon includes a first antenna (cellular antenna, labeled below) configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands.  **GSM/GPRS Tri-Band Module** GSM850 824 ~ 849, 869 ~ 894 MHz DCS1800 1710 ~ 1785, 1805 ~ 1880 MHz DCS1900 1850 ~ 1910, 1930 ~ 1990 MHz

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		See FCC User Manual at 189. **1.2 Antenna Configuration** The antenna operates in GSM850, DCS1800, PCS1900 bands, the phone fixture used is shown in Figure 1.  **Figure 1 : Test Fixture** *See* FCC Antenna Specification at 2. The at least three frequency bands are used for GSM mobile communication services.
8[c]	the at least three frequency bands being used for mobile communication services;	HTC Typhoon expressly or inherently discloses this claim element. *See* Claim 8[b].
8[d]	a second antenna configured to operate in at least one frequency band;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 395 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		The HTC Typhoon has a second antenna (Bluetooth (BT) antenna, labeled below) configured to operate in at least one frequency band.  *See* FCC Internal Photos at 4. **Frequency Range** 2402 ~ 2480 MHz

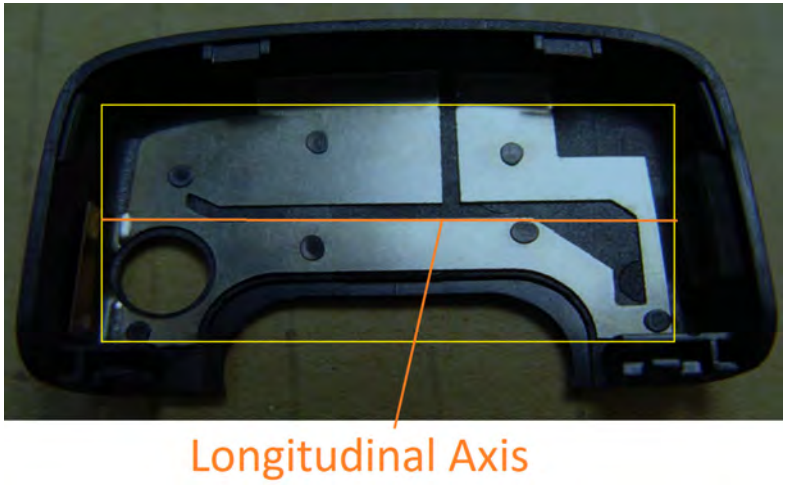
Fractus Exhibit 2003
Fractus v. Geotab
Page 396 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		See FCC Bluetooth Test Report at 4, 6, 11, 19, 34.
8[e]	the first antenna extends in a direction substantially parallel to a first side of the portable device;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the HTC Typhoon extends in a direction substantially parallel to a first side (blue below) of the HTC Typhoon.

Fractus Exhibit 2003
Fractus v. Geotab
Page 397 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 1. The radiating element is inscribed in the yellow rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as an orange line.

Fractus Exhibit 2003
Fractus v. Geotab
Page 398 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 5 (annotated).
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, A length of a second side (green below) of the HTC Typhoon is longer than a length of the first side (blue below) of the HTC Typhoon.

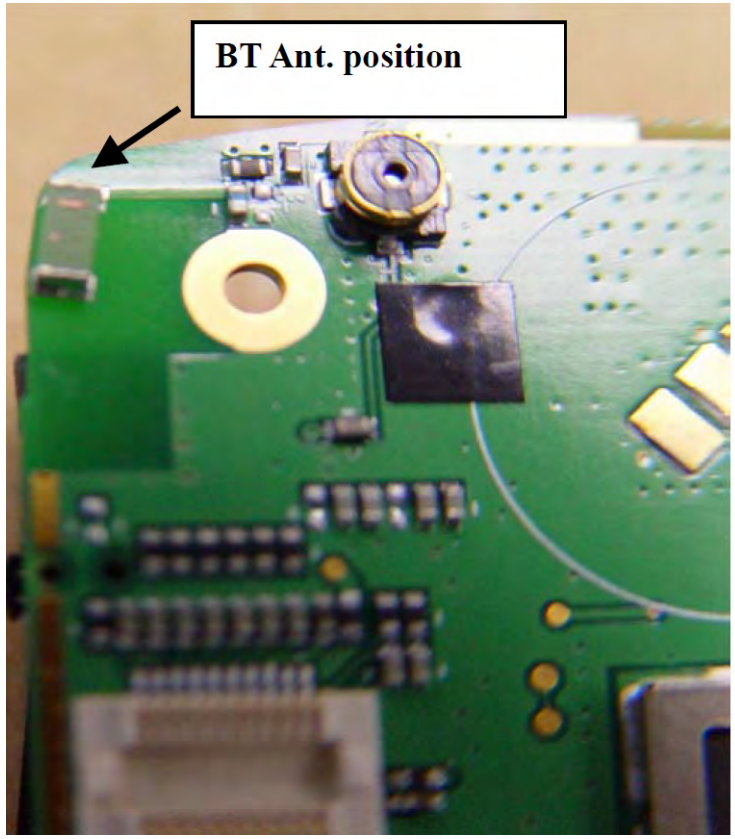
Fractus Exhibit 2003
Fractus v. Geotab
Page 399 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		See FCC Internal Photos at 1.
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the HTC Typhoon is arranged substantially close to the first side (blue below) of the HTC Typhoon. 

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 1.
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		The second antenna of the HTC Typhoon is arranged substantially close to a first corner of the HTC Typhoon.  *See* FCC Internal Photos at 4.

Fractus Exhibit 2003
Fractus v. Geotab
Page 403 of 563

		First Corner 

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		See FCC Internal Photos at 1.
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, The first corner of the HTC Typhoon corresponds to a first end of the first side (blue below) with an end of the second side (green below) of the HTC Typhoon.

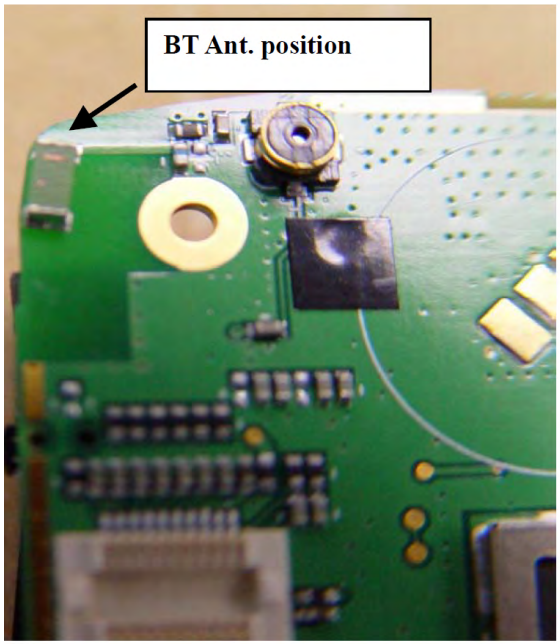
Fractus Exhibit 2003
Fractus v. Geotab
Page 405 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 1.
8[j]	the first antenna and the second antenna are located internally within the portable device.	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*,

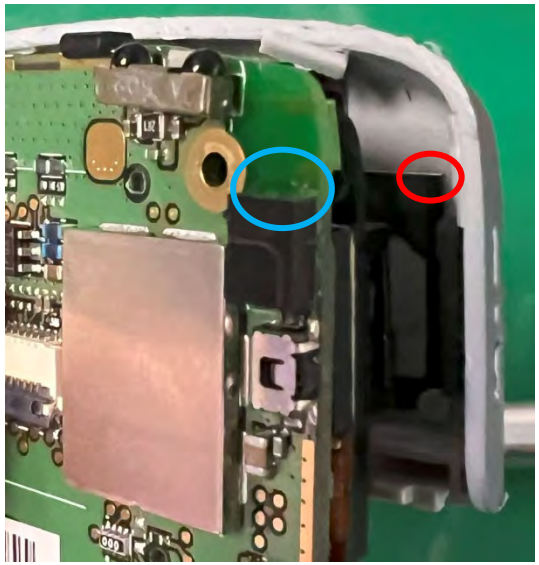
Fractus Exhibit 2003
Fractus v. Geotab
Page 406 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		The first antenna and the second antenna of the HTC Typhoon are located internally within the HTC Typhoon. 

Fractus Exhibit 2003
Fractus v. Geotab
Page 407 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		 *See* FCC Internal Photos at 4.
Claim 9		
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, In the HTC Typhoon/Audiovox SMT-5600, a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.

Fractus Exhibit 2003
Fractus v. Geotab
Page 408 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
	does not overlap with the ground plane.	A portion of the first antenna (circled in red below) has an orthogonal projection on a plane containing the ground plane that overlaps with a cutout (circled in blue below) in the ground plane.  

Fractus Exhibit 2003
Fractus v. Geotab
Page 409 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
	Claim 11	
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	HTC Typhoon expressly or inherently discloses this claim element. *See, e.g.*, To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. ***See, e.g.***, Sato at [0040] – [0041]: "The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch." ***See also, e.g.***, Talvitie at [0022], [0024], [0026], [0037]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 410 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	HTC Typhoon
		"FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120, and a second radiator 130." "the groove plane antenna is configured to radiate at least within one lower frequency range and within one or more higher frequency ranges…" "An example of a multifrequency mobile station configured to support MGSP 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges." "It is also possible to configure all GSM functionalities in one antenna A1 and, similarly, all WCDMA functionalities (transmission and reception) in another antenna A2 by means of a duplex filter…the strong isolation between the antennas reduces power losses between the antennas in such a configuration as well; this, again, preferably cuts down thermal losses and power consumption of the mobile station."

Fractus Exhibit 2003
Fractus v. Geotab
Page 411 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON THE NOKIA 6310i ("Nokia 6310i")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1]. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe the asserted claims, particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

Nokia Corporation's ("Nokia") 6310i, as publicly demonstrated, known, offered for sale, sold, and/or used by Nokia and/or customers of Nokia or otherwise available to the public, including in this country, ("Nokia 6310i") was conceived, reduced to practice by Nokia engineers no later than Mar. 22, 2002[2] and was available for purchase in the United States no later than December 15, 2002, which is prior to the critical date of the '458 Patent. Thus, the Nokia 6310i is available as prior art at least under pre-AIA 35 U.S.C. § 102(a)-(b), (g)(2) and 103(a). At least the following documents provide evidence as to the date the Nokia 6310i was "offered for sale or publicly used or known," "the date the offer or use of the item took place or the information became known", and the "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" [3]:

[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, 16, and 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.
[2] *See* AT&T Wireless Website, Archived December 15, 2002 at: http://web.archive.org/web/20021215132457/http:/www.attwireless.com/mmode/devices/6310i.jhtml (Last accessed June 12, 2025).
[3] Defendants do not yet have complete information regarding the dates by which this product was publicly disclosed, made, used, sold, or offered for sale, the circumstances under which the research, design, and development activities were conducted, and the identities of the particular individuals involved in such activities. Defendants anticipate that the actual dates, circumstances, and identities of individuals will be the subject of third party discovery during this lawsuit. Defendants therefore reserve the right to amend and/or supplement their Invalidity Contentions and this chart if additional information becomes available during the course of discovery. The date the Nokia 6310i was "offered for sale or publicly used or known," as well as "the date the offer or use of the item took place or the information became known" is at least as early as the dates identified in the published documents. The "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" includes at least those persons associated with the publication(s), press releases, and conference attendees, or other documents associated with each version on the Nokia 6310i. Defendants also reserve the right to rely on the public use, offer for sale, sale, or installation of the devices described in the publications identified herein once Defendants have had a fair opportunity to take discovery on these subjects.

Fractus Exhibit 2003
Fractus v. Geotab
Page 412 of 563

- AT&T Wireless Website, Archived December 15, 2002 at: http://web.archive.org/web/20021215132457/http:/www.attwireless.com/mmode/devices/6310i.jhtml (Last accessed June 12, 2025)
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "PPI"; Product Code: NPL-1"; Record Option: 2/3 "Detail"; Attachment: "External Photos new" (last accessed June 12, 2025) ("FCC External Photos")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "PPI"; Product Code: NPL-1"; Record Option: 2/3 "Detail"; Attachment: "Test Report for Accessories" (last accessed June 12, 2025) ("FCC Bluetooth Test Report")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "PPI"; Product Code: NPL-1"; Record Option: 2/3 "Detail"; Attachment: "Manual RFs on page 114 or 147" (last accessed June 12, 2025) ("FCC User Manual")
- Phonescoop.com, *Nokia 6310i*, https://www.phonescoop.com/phones/phone.php?p=122 (last accessed June 13, 2025)
- GSMArena.com, *Nokia 6310i*, https://www.gsmarena.com/nokia_6310i-317.php (last accessed June 13, 2025)
- PhoneArena.com, *Nokia 6310i*, https://www.phonearena.com/phones/Nokia-6310i_id139 (last accessed June 13, 2025)
- Wikipedia.com, *Nokia 6310i*, https://en.wikipedia.org/wiki/Nokia_6310 (last accessed June 13, 2025)

As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Nokia 6310i. To the extent that Nokia 6310i is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Nokia 6310i alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato")
- U.S. Patent Application Publication No. 2004/0135729 ("Talvitie")

One of ordinary skill in the art, as of the priority date of the '458 Patent, would have known to combine or modify the prior art elements disclosed by the foregoing references using known methods, and to use these elements according to their established functions in order to achieve a known and predictable result.

These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants retain the right to update their constructions and contentions in view of this Court's claim construction order.[4]

[4] Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

Fractus Exhibit 2003
Fractus v. Geotab
Page 413 of 563

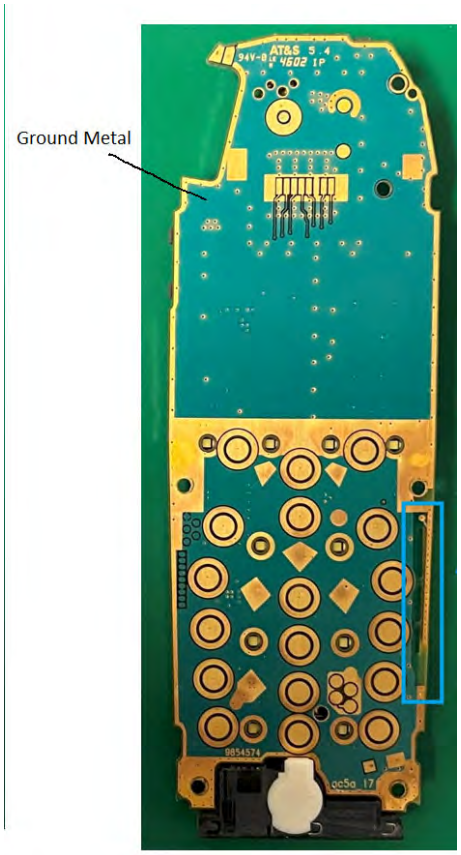
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
Claim 1		
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The Nokia 6310i was a mobile phone sold in the United States by Nokia through AT&T Wireless.

Fractus Exhibit 2003
Fractus v. Geotab
Page 414 of 563

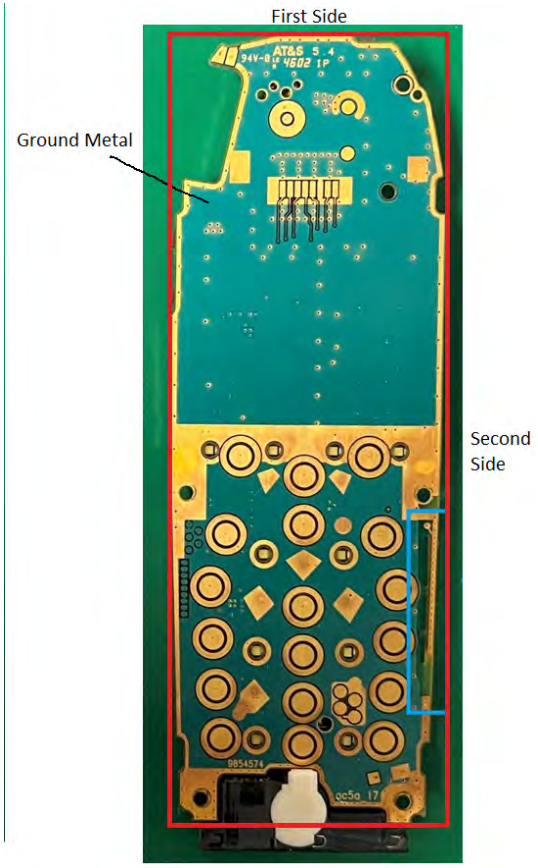
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		 *See* FCC External Photos at 1.

Fractus Exhibit 2003
Fractus v. Geotab
Page 415 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
1[a]	a ground plane;	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The Nokia 6310i includes a ground plane. The ground plane is a metal layer embedded in a printed circuit board that is housed within the plastic housing of the device. 

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		
1[b]	the ground plane is inscribed in a rectangular area comprising a first side and a second side,	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*,

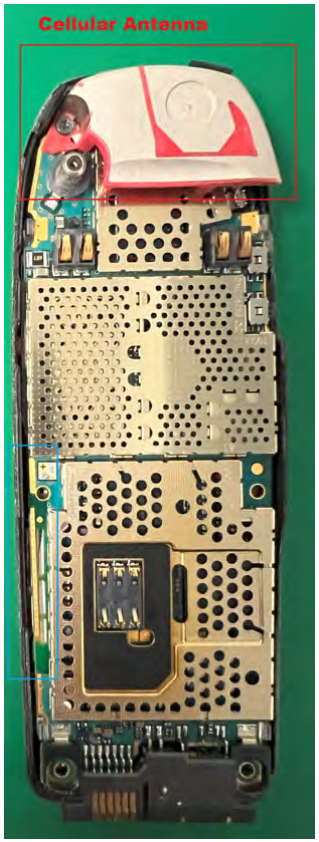
Fractus Exhibit 2003
Fractus v. Geotab
Page 417 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		The ground plane of the Nokia 6310i is inscribed in a rectangular area (shown in red below) comprising a first side (top side labeled below) and a second side (right side labeled below). A length of the second side is greater than a length of the first side. 

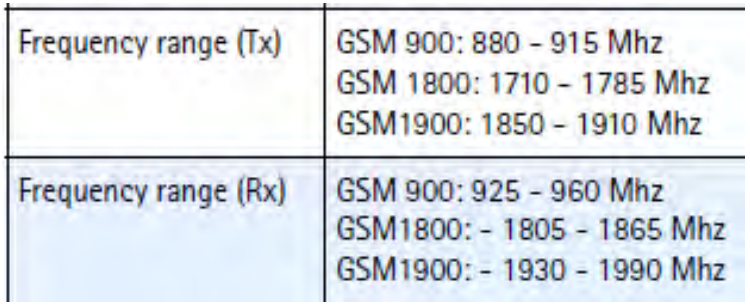
Fractus Exhibit 2003
Fractus v. Geotab
Page 418 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
1[c]	a length of the second side being greater than a length of the first side;	Nokia 6310i expressly or inherently discloses this claim element. *See* 1[b], *supra*.
1[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The Nokia 6310i includes a first antenna (cellular antenna, labeled below):

Fractus Exhibit 2003
Fractus v. Geotab
Page 419 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		 The first antenna of the Nokia 6310i is configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands:

Fractus Exhibit 2003
Fractus v. Geotab
Page 420 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		 *See* FCC User Manual at 129. The at least three frequency bands are used for GSM mobile communication services.
1[e]	the at least three frequency bands being used for mobile communication services;	Nokia 6310i expressly or inherently discloses this claim element. *See* 1[d], *supra*.
1[f]	a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band;	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The 6310i includes a second antenna (Bluetooth antenna, labeled below):

Fractus Exhibit 2003
Fractus v. Geotab
Page 421 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		 The second antenna of the Nokia 6310i is configured to receive electromagnetic waves corresponding to at least one frequency band from 2400 MHz to 2483.5 MHz:

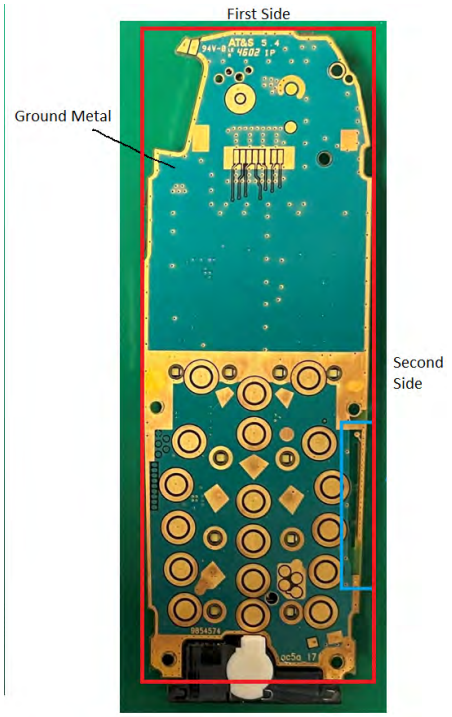
Fractus Exhibit 2003
Fractus v. Geotab
Page 422 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		1.5 Test item Type of equipment : **Triple Band Mobile with integrated Bluetooth module** Type designation : **NPL-1 with DCH-8D, ACP-12E** Manufacturer : applicant Street : City : Country : Serial number : See photographs **Additional informations: :** Frequency : 2400 – 2483.5 MHz Type of modulation : 1M00FXD / 79M8FXD (FHSS) Number of channels : 79 Antenna : integral antenna / print antenna Power supply : 3,6V DC Li-polymer Battery Output power : EIRP: 2.04mW Temperature range : *See* FCC Bluetooth Test Report at 3. The at least one frequency band is used for Bluetooth wireless connectivity services.
1[g]	the at least one frequency band being used for wireless connectivity services;	Nokia 6310i expressly or inherently discloses this claim element. *See* 1[f], *supra*.
1[h]	the first antenna extends in a direction substantially parallel to the first side;	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Nokia 6310i extends in a direction substantially parallel to the first side:

Fractus Exhibit 2003
Fractus v. Geotab
Page 423 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		 The radiating element is inscribed in the yellow rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as an orange line.

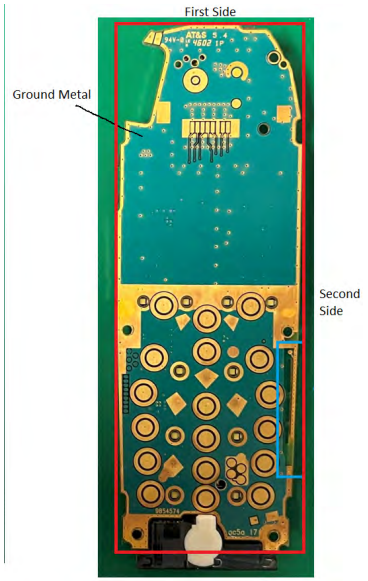
Fractus Exhibit 2003
Fractus v. Geotab
Page 424 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		
1[i]	the second antenna extends in a direction substantially parallel to the second side;	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the Nokia 6310i extends in a direction substantially parallel to the second side:

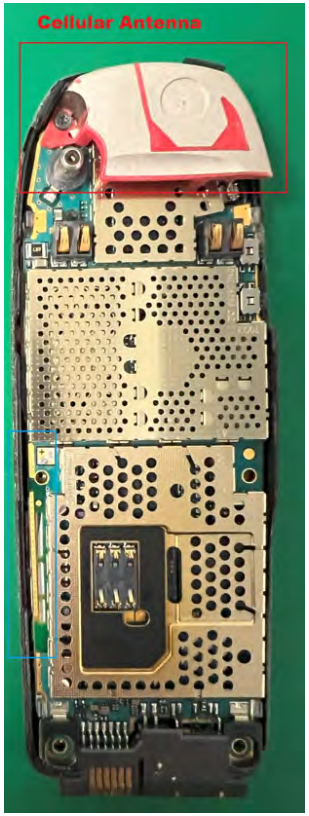
Fractus Exhibit 2003
Fractus v. Geotab
Page 425 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		 The radiating element is inscribed in the blue rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as a blue line.

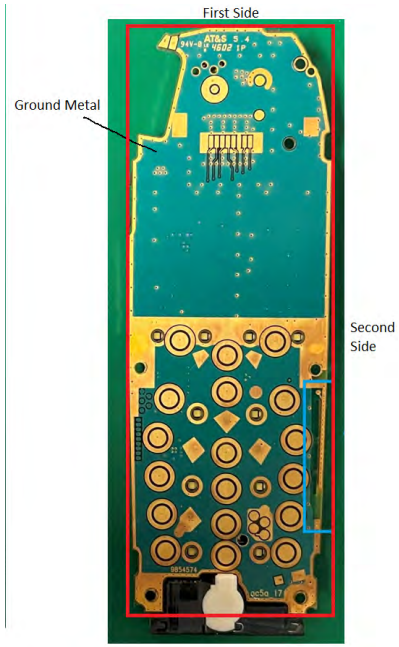
Fractus Exhibit 2003
Fractus v. Geotab
Page 426 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		
1[j]	the first antenna is arranged substantially close to the first side; and	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Nokia 6310i is arranged substantially close to the first side.

Fractus Exhibit 2003
Fractus v. Geotab
Page 427 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		

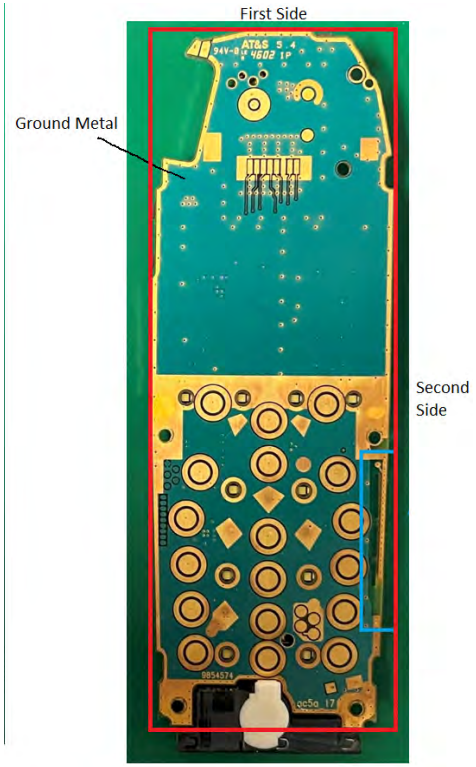
Fractus Exhibit 2003
Fractus v. Geotab
Page 428 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The first antenna and the second antenna of the Nokia 6310i are located internally within the Nokia 6310i.

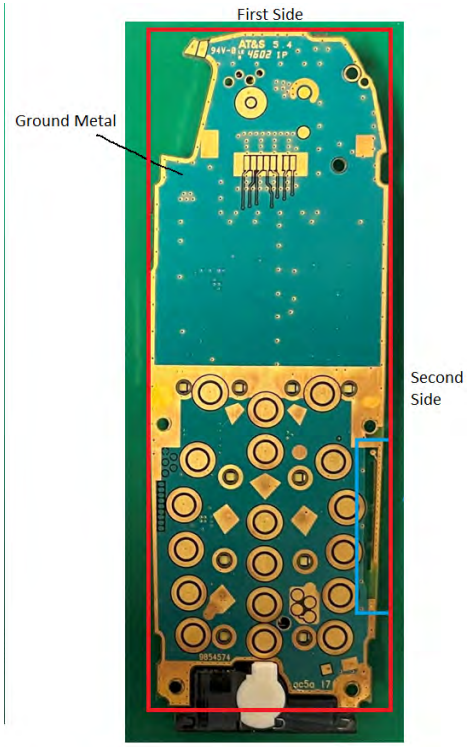
Fractus Exhibit 2003
Fractus v. Geotab
Page 429 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		
	Claim 2	
2	The wireless handheld or portable device according to claim 1, wherein the second antenna is arranged substantially close to the second side.	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the Nokia 6310i is arranged substantially close to the second side:

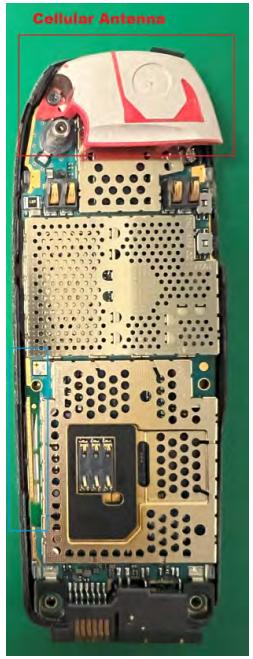
Fractus Exhibit 2003
Fractus v. Geotab
Page 430 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		
	Claim 3	
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
	close to a corner of the rectangular area.	The second antenna of the Nokia 6310i is arranged substantially close to a corner of the rectangular area: 
	Claim 4	
4	The wireless handheld or portable device according to claim 1, wherein the first antenna	Nokia 6310i expressly or inherently discloses this claim element.

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
	is arranged substantially close to a corner of the rectangular area.	*See, e.g.*, The first antenna of the Nokia 6310i is arranged substantially close to a corner of the rectangular area: 
	Claim 7	
7	The wireless handheld or portable device according to claim 1, wherein the at least one	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 433 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
	frequency band used for wireless connectivity services corresponds to at least one wireless connectivity service selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	For example, in the Nokia 6310i, the at least one frequency band used for wireless connectivity services corresponds to Bluetooth. **1.5 Test item** Type of equipment : **Triple Band Mobile with integrated Bluetooth module** Type designation : **NPL-1 with DCH-8D, ACP-12E** Manufacturer : applicant Street : City : Country : Serial number : See photographs **Additional informations: :** Frequency : 2400 – 2483.5 MHz Type of modulation : 1M00FXD / 79M8FXD (FHSS) Number of channels : 79 Antenna : integral antenna / print antenna Power supply : 3,6V DC Li-polymer Battery Output power : EIRP: 2.04mW Temperature range : *See* FCC Bluetooth Test Report at 3.
		Claim 11
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	Nokia 6310i expressly or inherently discloses this claim element. *See, e.g.*, To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.

Fractus Exhibit 2003
Fractus v. Geotab
Page 434 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		See, e.g.**, Sato** at [0040] – [0041]: "The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch." ***See also, e.g.***, Talvitie at [0022], [0024], [0026], [0037]: "FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120, and a second radiator 130." "the groove plane antenna is configured to radiate at least within one lower frequency range and within one or more higher frequency ranges…" "An example of a multifrequency mobile station configured to support MGSP 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges." "It is also possible to configure all GSM functionalities in one antenna A1 and, similarly, all WCDMA functionalities (transmission and reception) in another antenna A2 by means of a duplex filter…the strong isolation between the antennas reduces power losses between the

Fractus Exhibit 2003
Fractus v. Geotab
Page 435 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6310i
		antennas in such a configuration as well; this, again, preferably cuts down thermal losses and power consumption of the mobile station.”

Fractus Exhibit 2003
Fractus v. Geotab
Page 436 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON THE BLACKBERRY 7290 ("BLACKBERRY 7290")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1]. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe the asserted claims, particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

Research in Motion's ("RIM") Blackberry 7290, as publicly demonstrated, known, offered for sale, sold, and/or used by RIM and/or customers of RIM, or otherwise available to the public, including in this country, ("Blackberry 7290") was in public use and/or on sale in the U.S. at least by 2004. Specifically, the Blackberry 7290 was approved for use in the United States on September 29, 2004[2], and was available for purchase in the United States from AT&T Wireless no later than December 31, 2004, which is prior to the critical date of the '458 Patent. Thus, the Blackberry 7290 is available as prior art at least under pre-AIA 35 U.S.C. § 102(a)-(b), (g)(2) and 103(a). At least the following documents provide evidence as to the date the Blackberry 7290 was "offered for sale or publicly used or known," "the date the offer or use of the item took place or the information became known", and the "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" [3]:

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[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, 16, and 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.

[2] See AT&T Wireless Website, Archived December 7, 2004 at: https://web.archive.org/web/20041207142355/http://www.attwireless.com/smallbusiness/products/all_phones.jhtml (last accessed June 11, 2025); Blackberry Website - Press Release (Sept. 28, 2004): http://www.blackberry.com/news/press/2004/pr-28_09_2004-04.shtml (last accessed June 11, 2025).

[3] Defendants do not yet have complete information regarding the dates by which this product was publicly disclosed, made, used, sold, or offered for sale, the circumstances under which the research, design, and development activities were conducted, and the identities of the particular individuals involved in such activities. Defendants anticipate that the actual dates, circumstances, and identities of individuals will be the subject of third party discovery during this lawsuit. Defendants therefore reserve the right to amend and/or supplement their Invalidity Contentions and this chart if additional information becomes available during the course of discovery. The date the Blackberry 7290 was "offered for sale or publicly used or known," as well as "the date the offer or use of the item took place or the information became known" is at least as early as the dates identified in the published documents. The "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" includes at least those persons associated with the publication(s), press releases, and conference attendees, or other documents associated with each version on the Blackberry 7290. Defendants also reserve the right to rely on the public use, offer for sale, sale, or installation of the devices described in the publications identified herein once Defendants have had a fair opportunity to take discovery on these subjects.

Fractus Exhibit 2003
Fractus v. Geotab
Page 437 of 563

- AT&T Wireless Website, Archived December 7, 2004 at: https://web.archive.org/web/20041207142355/http://www.attwireless.com/smallbusiness/products/all_phones.jhtml (last accessed June 11, 2025)
- Blackberry Website - Press Release (Sept. 28, 2004): http://www.blackberry.com/news/press/2004/pr-28_09_2004-04.shtml (last accessed June 11, 2025)
- Phonescoop.com, *Blackberry 7290*, https://www.phonescoop.com/phones/phone.php?p=625 (last accessed June 13, 2025)
- GSMArena.com, *Blackberry 7290*, https://www.gsmarena.com/blackberry_7290-1348.php (last accessed June 13, 2025)
- PhoneDB.com, *Blackberry 7290*, https://phonedb.net/index.php?m=device&id=1476&c=rim_blackberry_7290 (last accessed June 13, 2025)
- PhoneArena.com. *Blackberry 7290*, https://www.phonearena.com/phones/BlackBerry-7290_id963 (last accessed June 13, 2025)
- Wikipedia.com, *Blackberry 7290*, https://en.wikipedia.org/wiki/List_of_BlackBerry_products (last accessed June 13, 2025)
- Keith Elder, "Cingular Blackberry 7290 First Impression – Review (Nov. 29, 2004): http://keithelder.net/2004/11/29/blackberry-7290-arrived/ (last accessed June 11, 2025)
- Blackberry Website – Press Releases, "RIM and O2 Introduce New BlackBerry 7290 Handheld in Europe" (Sept. 28, 2004): https://www.blackberry.com/news/press/2004/pr-28_09_2004-01.shtml (last accessed June 11, 2025)

As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Blackberry 7290. To the extent that Blackberry 7290 is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Blackberry 7290 alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato")
- U.S. Patent Application Publication No. 2004/0135729 ("Talvitie")

One of ordinary skill in the art, as of the priority date of the '458 Patent, would have known to combine or modify the prior art elements disclosed by the foregoing references using known methods, and to use these elements according to their established functions in order to achieve a known and predictable result.

These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including

Fractus Exhibit 2003
Fractus v. Geotab
Page 438 of 563

whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants retain the right to update their constructions and contentions in view of this Court's claim construction order.[4]

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
Claim 8		
8[pre]	A portable device comprising:	To the extent the preamble is limiting, the Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, The Blackberry 7290 is a portable device.

[4] Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

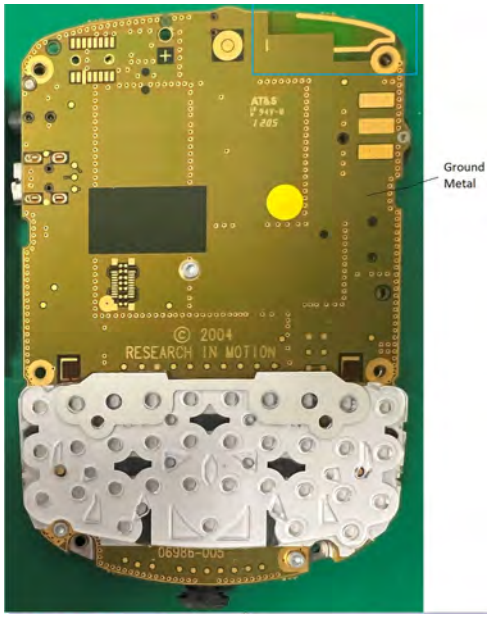
Fractus Exhibit 2003
Fractus v. Geotab
Page 439 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		 *See* Keith Elder, "Cingular Blackberry 7290 First Impression – Review (Nov. 29, 2004): http://keithelder.net/2004/11/29/blackberry-7290-arrived/ (last accessed June 11, 2025).
8[a]	a ground plane;	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, The Blackberry 7290 includes a ground plane. The ground plane is a metal layer embedded in a printed circuit board that is housed within the plastic housing of the device.

Fractus Exhibit 2003
Fractus v. Geotab
Page 440 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		

Fractus Exhibit 2003
Fractus v. Geotab
Page 441 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		
8[b]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, The Blackberry 7290 includes a first antenna (cellular antenna below) configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands.

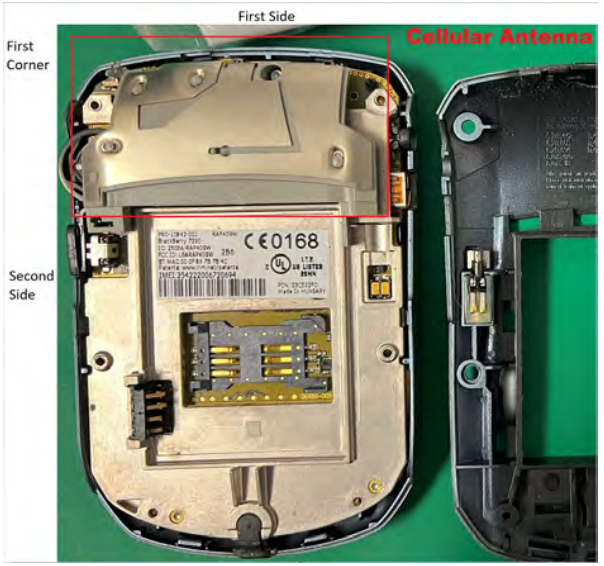
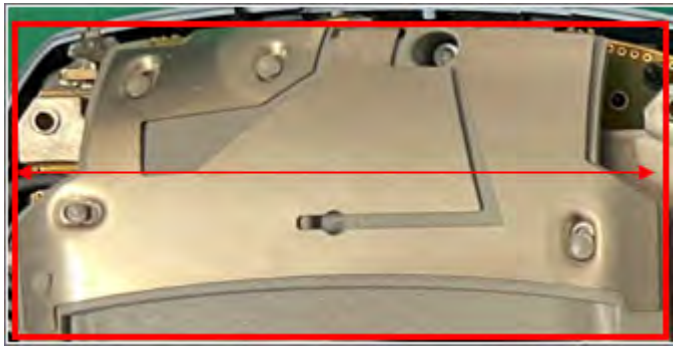
Fractus Exhibit 2003
Fractus v. Geotab
Page 442 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		 *See* Blackberry Website – Press Releases, "RIM and O2 Introduce New BlackBerry 7290 Handheld in Europe" (Sept. 28, 2004): https://www.blackberry.com/news/press/2004/pr-28_09_2004-01.shtml (last accessed June 11, 2025) ("New and enhanced features for the BlackBerry 7290 include: Quad-band support for GSM/GPRS 850/900/1800/1900 MHz frequencies"). The at least three frequency bands are used for GSM mobile communication services.
8[c]	the at least three frequency bands being used for mobile communication services;	Blackberry 7290 expressly or inherently discloses this claim element. *See* [8B], *supra.*

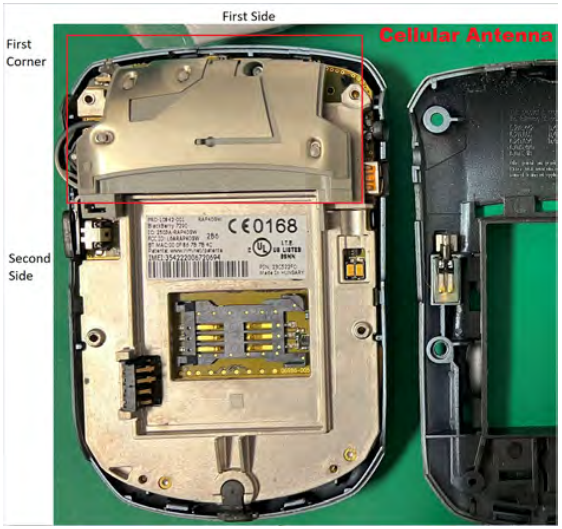
Fractus Exhibit 2003
Fractus v. Geotab
Page 443 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
8[d]	a second antenna configured to operate in at least one frequency band;	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, The Blackberry 7290 has a second antenna (Bluetooth antenna below) configured to operate in at least one frequency band. 
8[e]	the first antenna extends in a direction substantially parallel to a first side of the portable device;	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*,

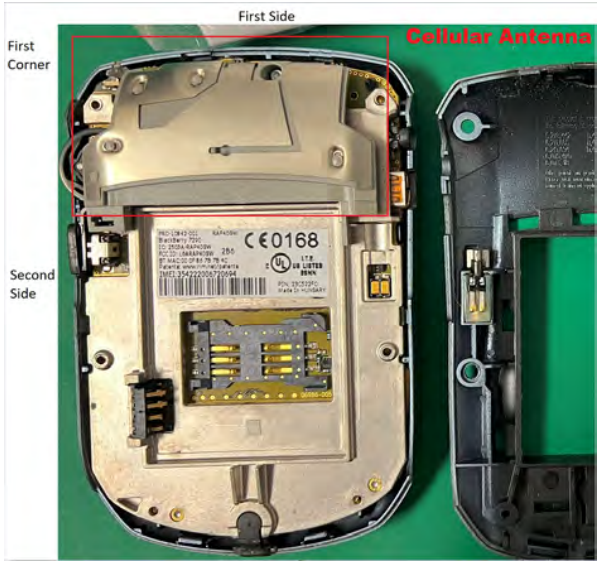
Fractus Exhibit 2003
Fractus v. Geotab
Page 444 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		The first antenna of the Blackberry 7290 extends in a direction substantially parallel to a first side of the Blackberry 7290.  

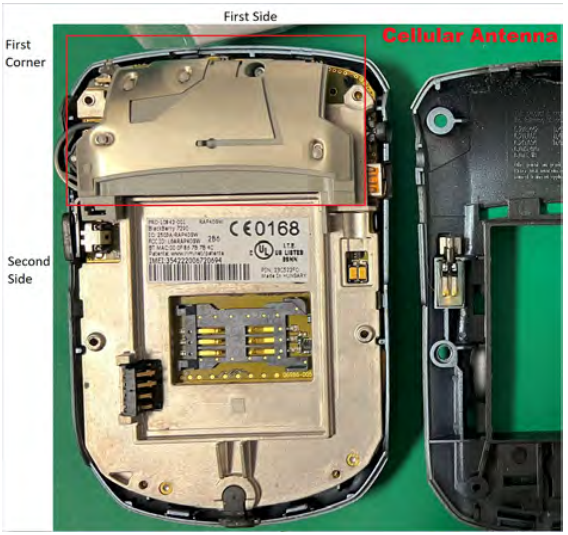
Fractus Exhibit 2003
Fractus v. Geotab
Page 445 of 563

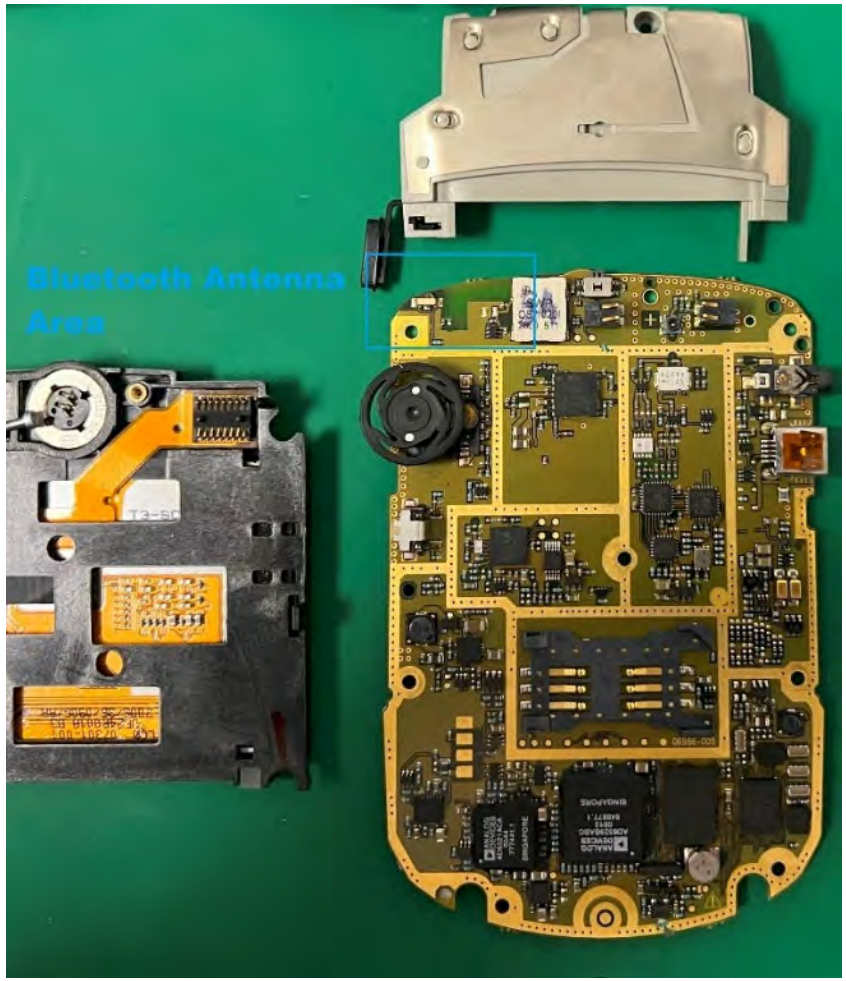
Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		The radiating element is inscribed in the red rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as a red line.
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, A length of a second side of the Blackberry 7290 is longer than a length of the first side of the portable device: 
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 446 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		The first antenna of the Blackberry 7290 is arranged substantially close to the first side of the Blackberry 7290: 
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the Blackberry 7290 is arranged substantially close to a first corner of the Blackberry 7290:

Fractus Exhibit 2003
Fractus v. Geotab
Page 447 of 563

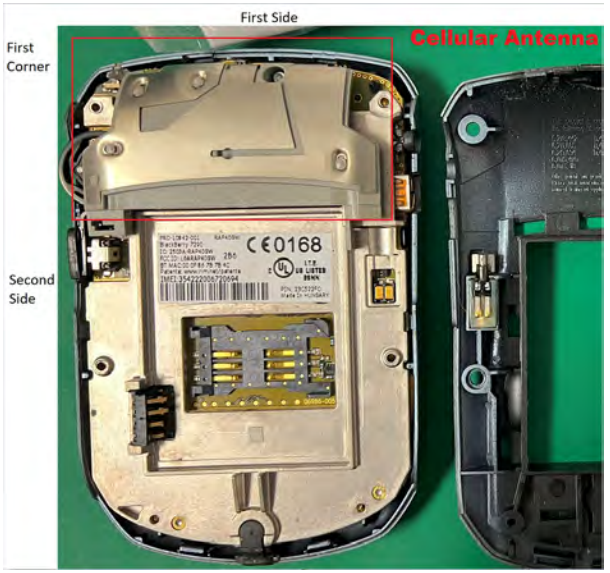
Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		

Fractus Exhibit 2003
Fractus v. Geotab
Page 449 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, The first corner of the Blackberry 7290 corresponds to a first end of the first side with an end of the second side of the Blackberry 7290:

Fractus Exhibit 2003
Fractus v. Geotab
Page 450 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		
8[j]	the first antenna and the second antenna are located internally within the portable device.	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna and the second antenna of the Blackberry 7290 are located internally within the Blackberry 7290:

Fractus Exhibit 2003
Fractus v. Geotab
Page 451 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		

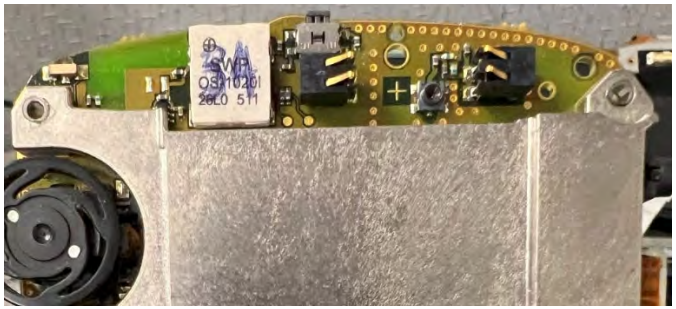
Fractus Exhibit 2003
Fractus v. Geotab
Page 452 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		
		Claim 9
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.	Blackberry 7290 expressly or inherently discloses this claim element. *See, e.g.*, In the Blackberry 7290, a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane:

Fractus Exhibit 2003
Fractus v. Geotab
Page 453 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		 The ground plane of the Blackberry 7290 has a cutout around the second antenna, and an orthogonal projection of the first antenna onto the plane of the PCB that contains the ground plane overlaps the cutout.

Fractus Exhibit 2003
Fractus v. Geotab
Page 454 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		 
Claim 11		
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	Blackberry 7290 expressly or inherently discloses this claim element. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants'

Fractus Exhibit 2003
Fractus v. Geotab
Page 455 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. ***See, e.g.***, Sato at [0040] – [0041]: "The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch." ***See also, e.g.***, Talvitie at [0022], [0024], [0026], [0037]: "FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120, and a second radiator 130." "the groove plane antenna is configured to radiate at least within one lower frequency range and within one or more higher frequency ranges…" "An example of a multifrequency mobile station configured to support MGSP 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges."

Fractus Exhibit 2003
Fractus v. Geotab
Page 456 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Blackberry 7290
		"It is also possible to configure all GSM functionalities in one antenna A1 and, similarly, all WCDMA functionalities (transmission and reception) in another antenna A2 by means of a duplex filter…the strong isolation between the antennas reduces power losses between the antennas in such a configuration as well; this, again, preferably cuts down thermal losses and power consumption of the mobile station."

Fractus Exhibit 2003
Fractus v. Geotab
Page 457 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON THE SIEMENS SX66/HTC BLUE ANGEL ("SIEMENS SX66")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1]. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe the asserted claims, particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

High Tech Computer Corporation's ("HTC") Siemens SX66 product, including also known and sold under the names HTC Blue Angel BSM Windows Mobile 2003 Second Edition PDA-phone, the i-mate PDA2k, the O2 XDA IIs, the Orange SPV M2000, the Dopod 700, the Qtek 9090, the T-Mobile MDA III, the Vodafone VPx, the Verizon XV6600 (Harrier), and the Sprint PPC-6601 (Harrier)[2] (commonly understood as and referred to herein as the "Siemens SX66") was approved for use in the United States on August 27, 2004[3], and was available for purchase in the United States from Cingular/ AT&T Wireless no later than December 31, 2004, which is prior to the critical date of the '458 Patent. Thus, the Siemens SX66 is available as prior art at least under pre-AIA 35 U.S.C. § 102(a)-(b), (g)(2) and 103(a). At least the following documents provide evidence as to the date the Siemens SX66 was "offered for sale or publicly used or known," "the date the offer or use of the item took place or the information became known", and the "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known"[4]:

[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, 16, and 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.
[2] *See* Wikipedia.com, *Siemens SX66*, https://en.wikipedia.org/wiki/HTC_Blue_Angel (last accessed June 13, 2025).
[3] *See* Phone Scoop Website, "Siemens SX66 / MDA III / PDA2K (HTC Blue Angel)," at: https://www.phonescoop.com/phones/phone.php?p=569 (last accessed June 11, 2025).
[4] Defendants do not yet have complete information regarding the dates by which this product was publicly disclosed, made, used, sold, or offered for sale, the circumstances under which the research, design, and development activities were conducted, and the identities of the particular individuals involved in such activities. Defendants anticipate that the actual dates, circumstances, and identities of individuals will be the subject of third party discovery during this lawsuit. Defendants therefore reserve the right to amend and/or supplement their Invalidity Contentions and this chart if additional information becomes available during the course of discovery. The date the Siemens SX66 was "offered for sale or publicly used or known," as well as "the date the offer or use of the item took place or the information became known" is at least as early as the dates identified in the published documents. The "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" includes at least those persons associated with the publication(s), press releases, and conference attendees, or other documents associated with each version on the Siemens SX66. Defendants also reserve the right to rely on the public use, offer for sale, sale, or installation of the devices described in the publications identified herein once Defendants have had a fair opportunity to take discovery on these subjects.

Fractus Exhibit 2003
Fractus v. Geotab
Page 458 of 563

- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "NM8"; Product Code: BLUEANGEL"; Record Option: 3/4 "Detail"; Attachment: "antenna spec" (last accessed June 11, 2025) ("FCC Antenna Spec")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "NM8"; Product Code: BLUEANGEL"; Record Option: 1/4 "Detail"; Attachment: "test report" (last accessed June 11, 2025) ("FCC Bluetooth Test Report")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "NM8"; Product Code: BLUEANGEL"; Record Option: 1/4 "Detail"; Attachment: "Internal Photo" (last accessed June 11, 2025) ("FCC Internal Photos")
- Phone Scoop Website, "Siemens SX66 / MDA III / PDA2K (HTC Blue Angel)," at: https://www.phonescoop.com/phones/phone.php?p=569 (last accessed June 11, 2025)
- GSMArena.com, *Siemens SX66*, https://www.gsmarena.com/siemens_sx66-992.php (last accessed June 13, 2025)
- PhoneArena.com, *Siemens SX66*, https://www.phonearena.com/news/Cingular-launches-Siemens-SX66_id432 (last accessed June 13, 2025)
- PhoneDB.com, *HTC Blue Angel*, https://phonedb.net/index.php?m=device&id=113&c=siemens_sx66__htc_blue_angel (last accessed June 13, 2025)
- Wikipedia.com, *HTC Blue Angel*, https://en.wikipedia.org/wiki/HTC_Blue_Angel (last accessed June 13, 2025)

As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Siemens SX66. To the extent that Siemens SX66 is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Siemens SX66 alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

One of ordinary skill in the art, as of the priority date of the '458 Patent, would have known to combine or modify the prior art elements disclosed by the foregoing references using known methods, and to use these elements according to their established functions in order to achieve a known and predictable result.

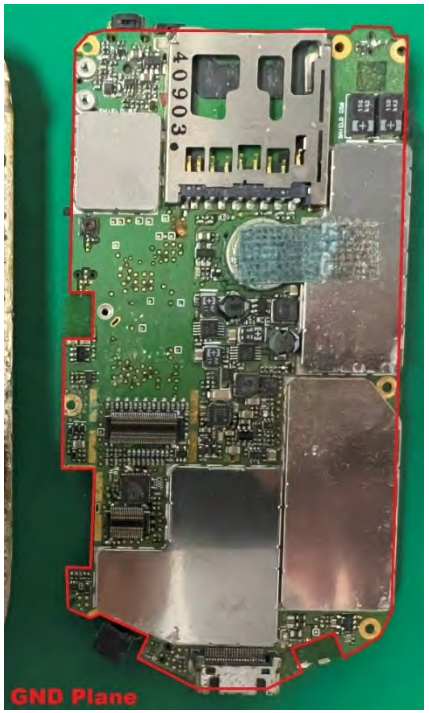
These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants retain the right to update their constructions and contentions in view of this Court's claim construction order.[5]

[5] Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

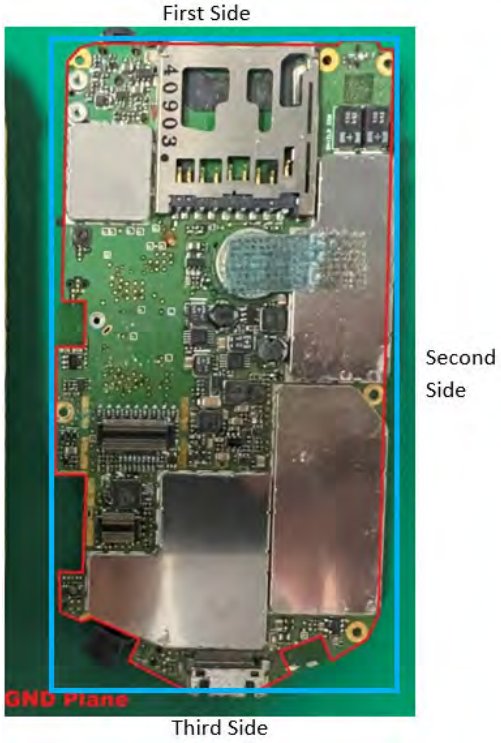
Fractus Exhibit 2003
Fractus v. Geotab
Page 459 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
	Claim 14	
14[pre]	A wireless handheld or portable device comprising:	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*,  *See* Phone Scoop Website, "Siemens SX66 / MDA III / PDA2K (HTC Blue Angel)," at: https://www.phonescoop.com/phones/phone.php?p=569 (last accessed June 11, 2025)
14[a]	a ground plane;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 460 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		The ground plane is a metal layer embedded in a printed circuit board that is housed within the plastic housing of the device. 
14[b]	the ground plane is inscribed in a first rectangular area comprising a first side, a second side and a third side,	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 461 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		The ground plane of the Siemens SX66 is inscribed in a first rectangular area (labeled in blue below) comprising a first side, a second side, and a third side, a length of the second side being greater than a length of the first side and a length of the third side: 
14[c]	a length of the second side being greater than a length of the first	Siemens SX66 expressly or inherently discloses this claim element. *See* Claim 14[b] *supra*.

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
	side and a length of the third side;	
14[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least two frequency bands;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, The Siemens SX66 has a first antenna (cellular antenna labeled below) configured to transmit and receive electromagnetic waves corresponding to at least two frequency bands.

Fractus Exhibit 2003
Fractus v. Geotab
Page 463 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		

Fractus Exhibit 2003
Fractus v. Geotab
Page 464 of 563

<table>
<tr><th>Claim No.</th><th>U.S. Patent No. 8,810,458 B2</th><th>Siemens SX66</th></tr>
<tr><td></td><td></td><td>GSM antenna：
<table><tr><th colspan="2">Antenna Information</th></tr><tr><td>Type</td><td>PIFA</td></tr><tr><td>Location of antenna</td><td>The top of the system</td></tr><tr><td>Dimensions</td><td>Length: 43 mm , Width 30 mm</td></tr><tr><td>Configuration</td><td></td></tr></table>
Peak Gain:
GSM 850 = -2.5 dBi
GSM 900 = -1.5dBi
DCS 1800 = -1.5 dBi
PCS 1900 = -1.5 dBi

See FCC Antenna Spec at 1.

The at least two frequency bands are used for GSM mobile communication services.</td></tr>
<tr><td>14[e]</td><td>the at least two frequency bands being used for mobile communication services;</td><td>Siemens SX66 expressly or inherently discloses this claim element.

See 14[d], supra.</td></tr>
<tr><td>14[f]</td><td>a second antenna configured to operate in at least one frequency band;</td><td>Siemens SX66 expressly or inherently discloses this claim element.

See, e.g.,

The Siemens SX66 has a second antenna (WLAN antenna labeled below) configured to operate in at least one frequency band from 2412-2462 MHz.</td></tr>
</table>

Fractus Exhibit 2003
Fractus v. Geotab
Page 465 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		

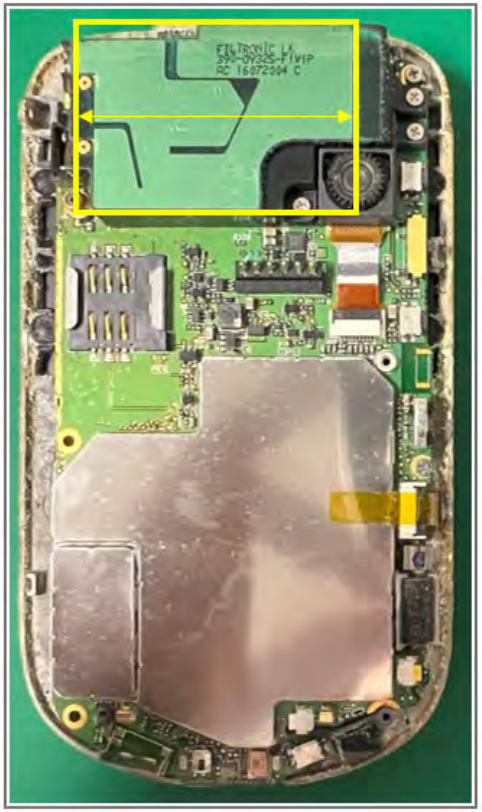
Frequency Range	WLAN: 2412 – 2462 MHz Bluetooth: 2402 MHz – 2480 MHz

See FCC Bluetooth Test Report at 4.

Fractus Exhibit 2003
Fractus v. Geotab
Page 466 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		The at least one frequency band of the second antenna is different from the at least two frequency bands of the first antenna.
14[g]	the at least one frequency band being different from the at least two frequency bands;	Siemens SX66 expressly or inherently discloses this claim element. *See* 4[f], *supra.*
14[h]	the first antenna extends in a direction substantially parallel to the first side;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Siemens SX66 extends in a direction substantially parallel to the first side:

Fractus Exhibit 2003
Fractus v. Geotab
Page 467 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		

Fractus Exhibit 2003
Fractus v. Geotab
Page 468 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		First Side  Second Side Third Side

Fractus Exhibit 2003
Fractus v. Geotab
Page 469 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
14[i]	the first antenna is proximate to the first side;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Siemens SX66 is proximate to the first side:

Fractus Exhibit 2003
Fractus v. Geotab
Page 470 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		

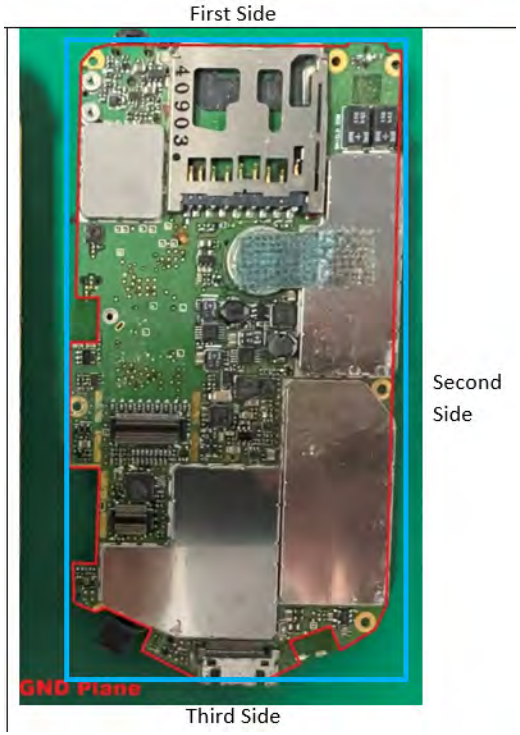
Fractus Exhibit 2003
Fractus v. Geotab
Page 471 of 563

		First Side 

Fractus Exhibit 2003
Fractus v. Geotab
Page 472 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
14[j]	the second antenna extends in a direction substantially parallel to the third side;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the Siemens SX66 extends in a direction substantially parallel to the third side:  The radiating element is inscribed in the red rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as a red line.

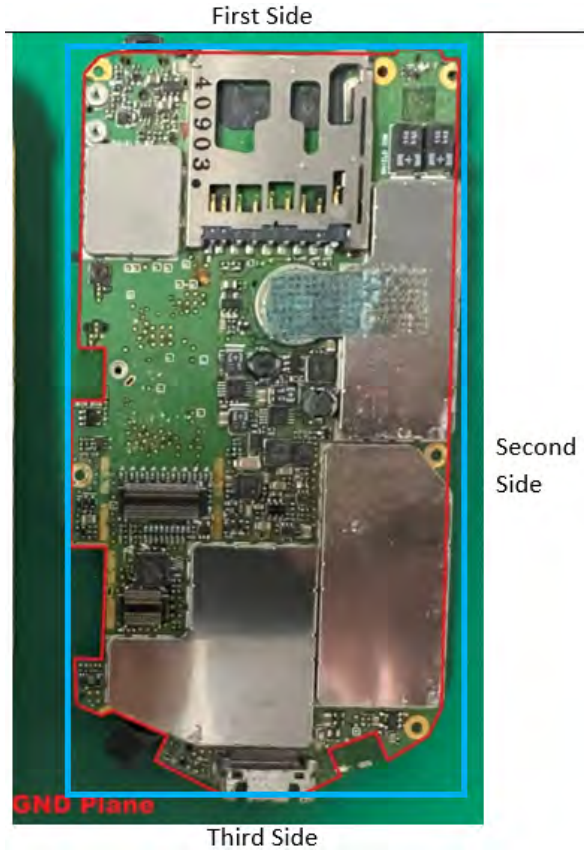
Fractus Exhibit 2003
Fractus v. Geotab
Page 473 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		
14[k]	the second antenna is proximate to the third side;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the Siemens SX66 is proximate to the third side.

Fractus Exhibit 2003
Fractus v. Geotab
Page 474 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		

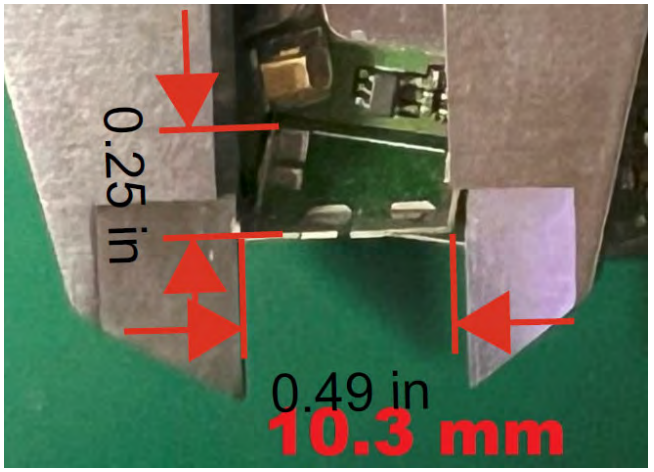
Fractus Exhibit 2003
Fractus v. Geotab
Page 475 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		
14[l]	the second antenna is inscribed in a second rectangular area;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 476 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		The second antenna of the Siemens SX66 is inscribed in a second rectangular area (in red below): 
14[m]	a sum of a length and a width of the second rectangular area is smaller than a quarter of an operating wavelength of the second antenna;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 477 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		 A sum of a length and a width of the second rectangular area is 15.45mm. A quarter of an operating wavelength at 2412-2462 MHz is 31-30.4mm. <table><tr><td>**Frequency Range**</td><td>WLAN: 2412 – 2462 MHz Bluetooth: 2402 MHz – 2480 MHz</td></tr></table> *See* FCC Bluetooth Test Report at 4.
14[n]	a geometry of the first antenna being different than a geometry of the second antenna;	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, A geometry of the first antenna of the Siemens SX66 is different than a geometry of the second antenna of the Siemens SX66.

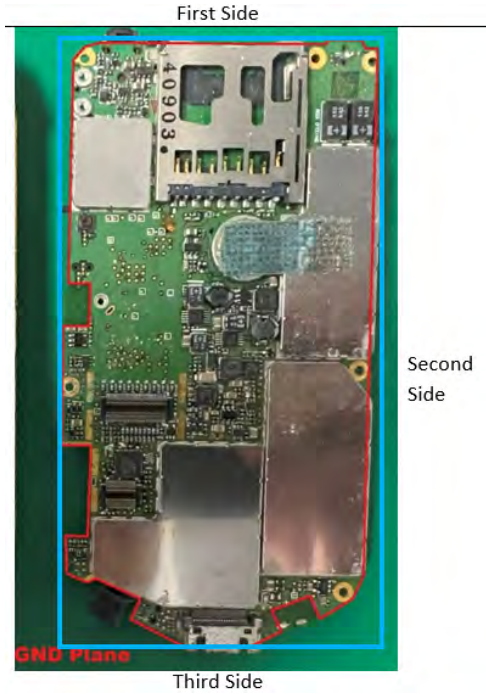
Fractus Exhibit 2003
Fractus v. Geotab
Page 478 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		
14[o]	at least one of the first antenna and the second antenna is proximate to a corner of the first rectangular area; and	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, At least one of the first antenna and the second antenna is proximate to a corner of the first rectangular area.

Fractus Exhibit 2003
Fractus v. Geotab
Page 479 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		The first antenna is proximate to a corner of the first side and the second side, and the second antenna is proximate to a corner of the third side and the second side: 

Fractus Exhibit 2003
Fractus v. Geotab
Page 480 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		
14[p]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna and the second antenna of the Siemens SX66 are located internally within the Siemens SX66.

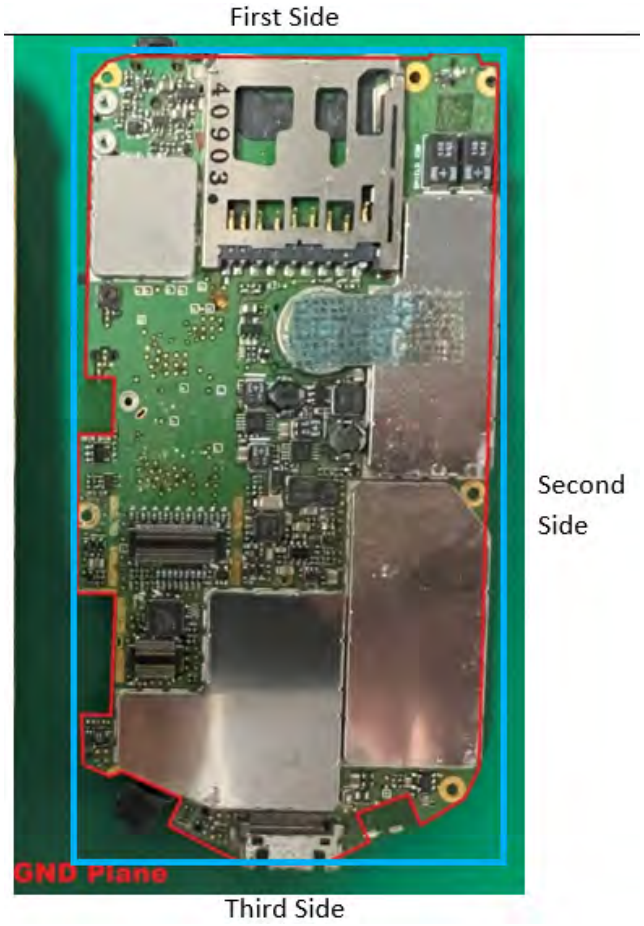
Fractus Exhibit 2003
Fractus v. Geotab
Page 481 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		
	Claim 15	
15[pre]	The wireless handheld or portable device according to claim 14,	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Siemens SX66 is proximate to a first corner of the first rectangular area and the second antenna of the Siemens SX66 is proximate to a second corner of the first rectangular area. The first antenna is proximate to a corner of the first side and the second side, and the second antenna is proximate to a corner of the third side and the second side.

Fractus Exhibit 2003
Fractus v. Geotab
Page 482 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		

Fractus Exhibit 2003
Fractus v. Geotab
Page 483 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
		

Fractus Exhibit 2003
Fractus v. Geotab
Page 484 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Siemens SX66
15[a]	wherein the first antenna is proximate to a first corner of the first rectangular area and	Siemens SX66 expressly or inherently discloses this claim element. *See* 15[pre], *supra*.
15[b]	the second antenna is proximate to a second corner of the first rectangular area.	Siemens SX66 expressly or inherently discloses this claim element. *See* 15[pre], *supra*.
17	The wireless handheld or portable device according to claim 14, wherein the at least one frequency band is used for a wireless connectivity service selected from the group comprising: Bluetooth™, IEEE802.11a, IEEE802.11b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	Siemens SX66 expressly or inherently discloses this claim element. *See, e.g.*, The at least one frequency band of the second antenna of the Siemens SX66 is used for a WLAN wireless connectivity service.

Fractus Exhibit 2003
Fractus v. Geotab
Page 485 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON THE SONY ERICSSON GC79 ("SONY ERICSSON GC79")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of claims 1, 2, 3, 4, 7, 8, 9, 11, 14, 15, and 17 (the "'458 Asserted Claims")[1]. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe the asserted claims, particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

Sony Ericsson Mobile Communications' ("Sony Ericsson") Sony Ericsson GC79, as publicly demonstrated, known, offered for sale, sold and/or used by Sony Ericsson and/or customers of Sony Ericsson, or otherwise available to the public, including in this country, ("Sony Ericsson GC79") was approved for use in the United States on July 31, 2003, and was available for purchase in the United States no later than October 7, 2004, which is prior to the critical date of the '458 patent.[2]. Thus, the Sony Ericsson GC79 is available as prior art at least under pre-AIA 35 U.S.C. § 102(a)-(b), (g)(2) and 103(a). At least the following documents provide evidence as to the date the Sony Ericsson GC79 was "offered for sale or publicly used or known," "the date the offer or use of the item took place or the information became known", and the "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known"[3]:

[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, 16, and 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.
[2] *See* https://www.t-mobile.com/news/press/wireless-data-and-internet-access-made-simple-one-card-does-it
[3] Defendants do not yet have complete information regarding the dates by which this product was publicly disclosed, made, used, sold, or offered for sale, the circumstances under which the research, design, and development activities were conducted, and the identities of the particular individuals involved in such activities. Defendants anticipate that the actual dates, circumstances, and identities of individuals will be the subject of third party discovery during this lawsuit. Defendants therefore reserve the right to amend and/or supplement their Invalidity Contentions and this chart if additional information becomes available during the course of discovery. The date the Sony Ericsson GC79 was "offered for sale or publicly used or known," as well as "the date the offer or use of the item took place or the information became known" is at least as early as the dates identified in the published documents. The "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" includes at least those persons associated with the publication(s), press releases, and conference attendees, or other documents associated with each version on the Sony Ericsson GC79. Defendants also reserve the right to rely on the public use, offer for sale, sale, or installation of the devices described in the publications identified herein once Defendants have had a fair opportunity to take discovery on these subjects.

Fractus Exhibit 2003
Fractus v. Geotab
Page 486 of 563

- T-Mobile Website, Press Releases, "Wireless Data and Internet Access Made Simple: One Card Does it All (Oct. 6, 2004): https://www.t-mobile.com/news/press/wireless-data-and-internet-access-made-simple-one-card-does-it (last accessed June 11, 2025)
- Manuals Lib Website, Sony Ericsson GC79 User Manual: https://www.manualslib.com/manual/161844/Sony-Ericsson-Gc79.html (last accessed June 11, 2025)
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "PY7"; Product Code: "F1021011"; Record Option: 1/4 "Detail"; Attachment: "Part 24 Report" (last accessed June 11, 2025) ("FCC GSM Test Report")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "PY7"; Product Code: "F1021011"; Record Option: 2/4 "Detail"; Attachment: "Internal Pictures" (last accessed June 11, 2025) ("FCC Internal Photos")
- FCC ID Search, https://www.fcc.gov/oet/ea/fccid (Grantee Code: "PY7"; Product Code: "F1021011"; Record Option: 2/4 "Detail"; Attachment: "WLAN Test Report" (last accessed June 11, 2025) ("FCC WLAN Test Report")
- Wikipedia.com, *Sony Ericsson GC79*, https://en.wikipedia.org/wiki/List_of_Sony_Ericsson_products (last accessed June 13, 2025)

As described in the following claim chart, the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Sony Ericsson GC79. To the extent that Sony Ericsson GC79 is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Sony Ericsson GC79 alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts, including without limitation as set forth below.

- U.S. Patent Application Publication No. 2004/0043727 to Sato ("Sato")
- U.S. Patent Application Publication No. 2004/0135729 ("Talvitie")

One of ordinary skill in the art, as of the priority date of the '458 Patent, would have known to combine or modify the prior art elements disclosed by the foregoing references using known methods, and to use these elements according to their established functions in order to achieve a known and predictable result.

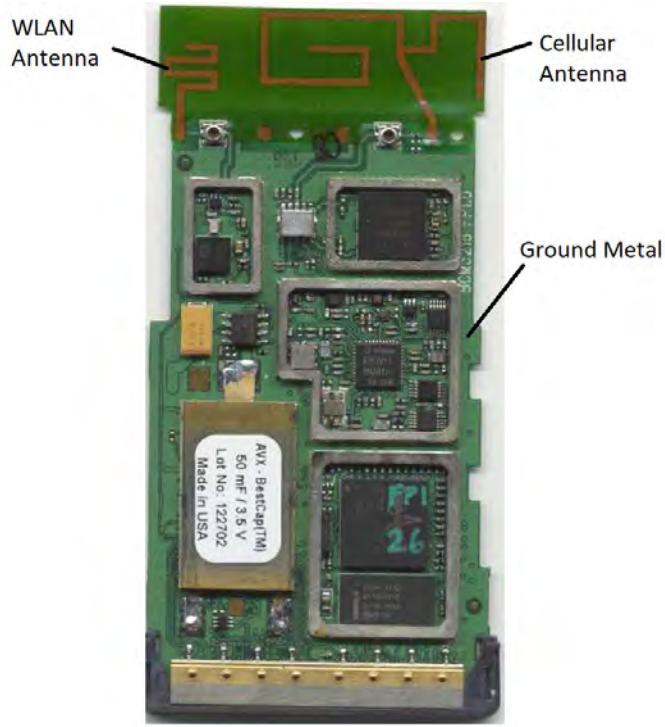
These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants retain the right to update their constructions and contentions in view of this Court's claim construction order.[4]

[4] Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

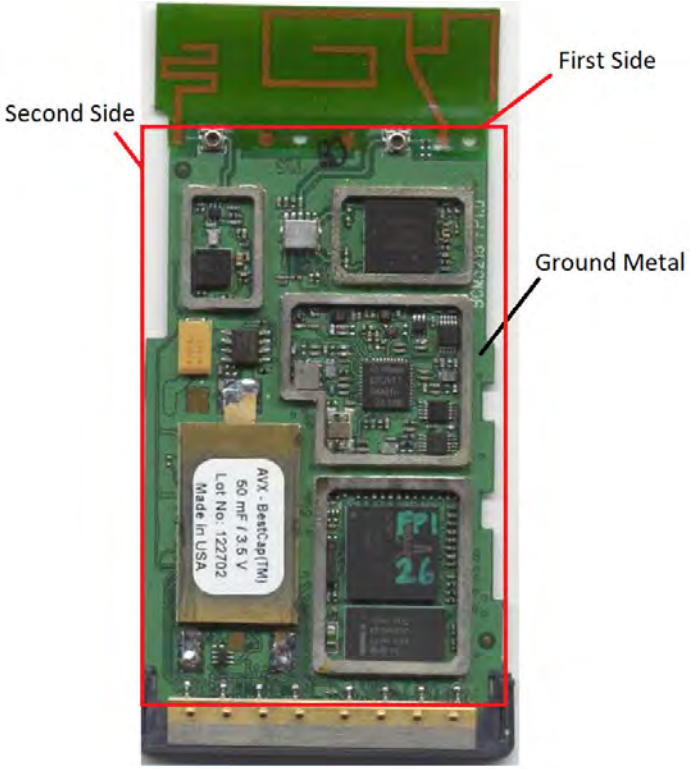
Fractus Exhibit 2003
Fractus v. Geotab
Page 487 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
Claim 1		
1[pre]	A wireless handheld or portable device comprising:	To the extent the preamble is limiting, Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The Sony Ericsson GC79 is a PCMCIA card, a portable device, sold in the United States through Cingular/AT&T Wireless, for use in laptops, which are also portable devices.  *See* Manuals Lib Website, Sony Ericsson GC79 User Manual: https://www.manualslib.com/manual/161844/Sony-Ericsson-Gc79.html (last accessed June 11, 2025)
1[a]	a ground plane;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 488 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		The Sony Ericsson GC79 includes a ground plane. The ground plane is a metal layer embedded in a printed circuit board that is housed within the plastic housing of the device.  *See* FCC Internal Photos at 1 (annotated).
1[b]	the ground plane is inscribed in a rectangular area	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*,

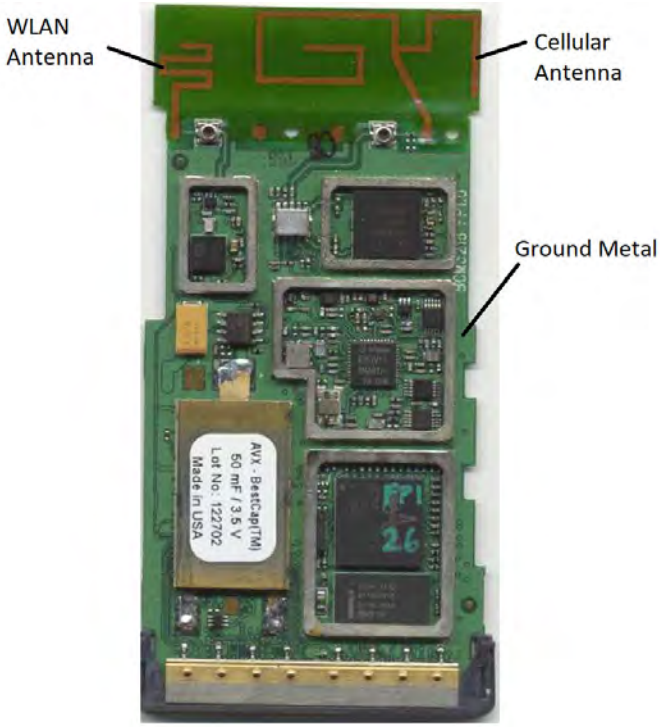
Fractus Exhibit 2003
Fractus v. Geotab
Page 489 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
	comprising a first side and a second side,	The ground plane of the Sony Ericsson GC79 is inscribed in a rectangular area (shown in red below) comprising a first side (top side labeled below) and a second side (left side labeled below). A length of the second side is greater than a length of the first side.  *See* FCC Internal Photos at 1 (annotated).

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
1[c]	a length of the second side being greater than a length of the first side;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See* Claim 1[b].
1[d]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The Nokia Sony Ericsson GC79 includes a first antenna (cellular antenna, labeled below).

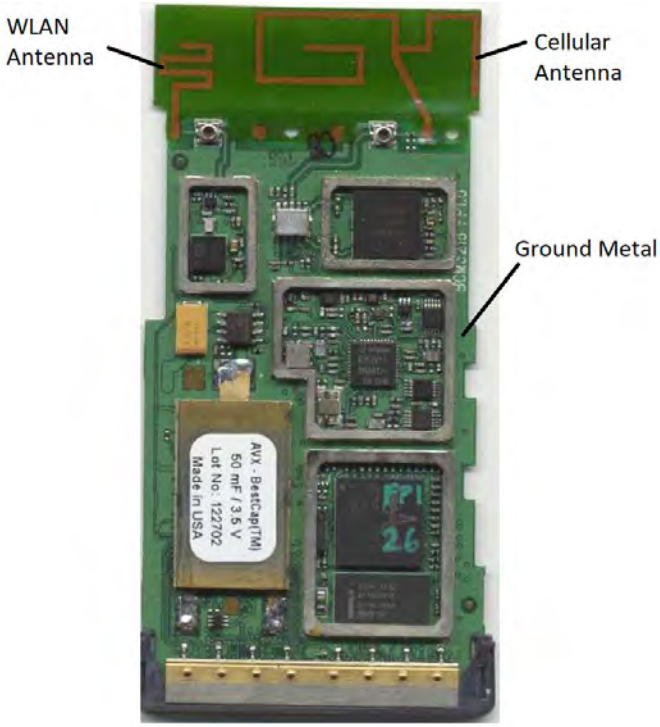
Fractus Exhibit 2003
Fractus v. Geotab
Page 491 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1. The first antenna of the Sony Ericsson GC79 is configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands:

Fractus Exhibit 2003
Fractus v. Geotab
Page 492 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		1.5 Test item Manufacturer : Applicant Marketing Name : GC79 Model No. : GC79 Host Laptop Model : Sony Viao (S/No. 28305630 3208479) Description : GSM triband (900/1800/1900) & 802.11b PCMCIA card FCC-ID : PY7F1021011 *See* FCC GSM Test Report at 3. The at least three frequency bands are used for GSM mobile communication services.
1[e]	the at least three frequency bands being used for mobile communication services;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See* Claim 1[d].
1[f]	a second antenna configured to receive electromagnetic waves corresponding to at least one frequency band;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The Sony Ericsson GC79 includes a second antenna (WLAN antenna, labeled below).

Fractus Exhibit 2003
Fractus v. Geotab
Page 493 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated). The second antenna of the Sony Ericsson GC79 is configured to receive electromagnetic waves corresponding to at least one frequency band from 2412 MHz to 2462 MHz:

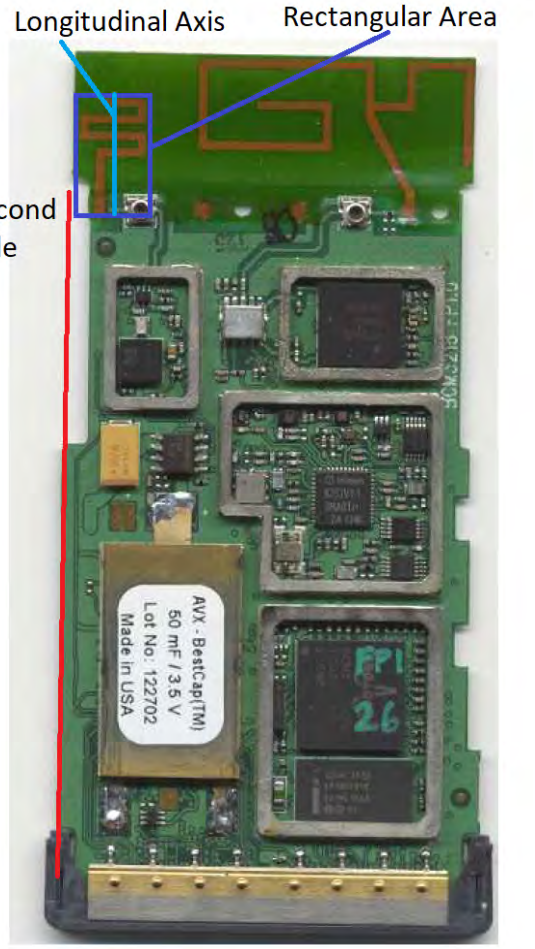
Fractus Exhibit 2003
Fractus v. Geotab
Page 494 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		1.5 Test item Manufacturer : Applicant Marketing Name : GC79 Model No. : GC79 Host Laptop Model : Dell Inspiron 8500 Description : GSM triband (900/1800/1900) & 802.11b PCMCIA card FCC-ID : PY7F1021011 **Additional information** Frequency : 2412MHz – 2462MHz for 802.11b *See* FCC WLAN Test Report at 3. The at least one frequency band is used for 802.11b wireless connectivity services.
1[g]	the at least one frequency band being used for wireless connectivity services;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See* Claim 1[f].
1[h]	the first antenna extends in a direction substantially parallel to the first side;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Sony Ericsson GC79 extends in a direction substantially parallel to the first side.

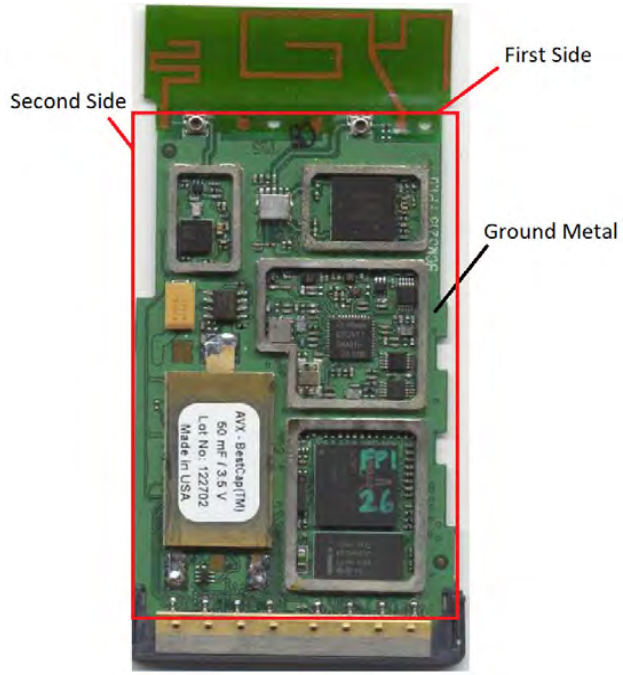
Fractus Exhibit 2003
Fractus v. Geotab
Page 495 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (cropped, annotated). The radiating element is inscribed in the yellow rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as an orange line.
1[i]	the second antenna extends in a direction substantially parallel to the second side;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the Sony Ericsson GC79 extends in a direction substantially parallel to the second side.

Fractus Exhibit 2003
Fractus v. Geotab
Page 496 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated).

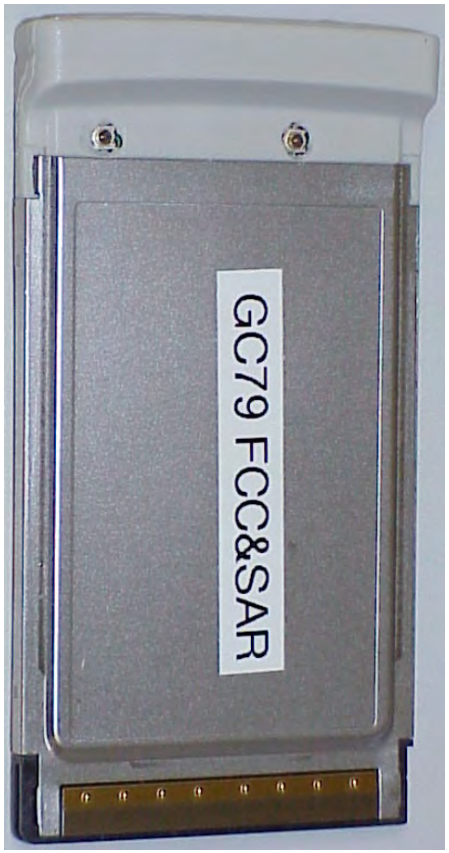
Fractus Exhibit 2003
Fractus v. Geotab
Page 497 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		The radiating element is inscribed in the blue rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as a light blue line.
1[j]	the first antenna is arranged substantially close to the first side; and	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Sony Ericsson GC79 is arranged substantially close to the first side.  *See* FCC Internal Photos at 1 (annotated).

Fractus Exhibit 2003
Fractus v. Geotab
Page 498 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
1[k]	the first antenna and the second antenna are located internally within the wireless handheld or portable device.	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna and the second antenna of the Sony Ericsson GC79 are located internally within the Sony Ericsson GC79.

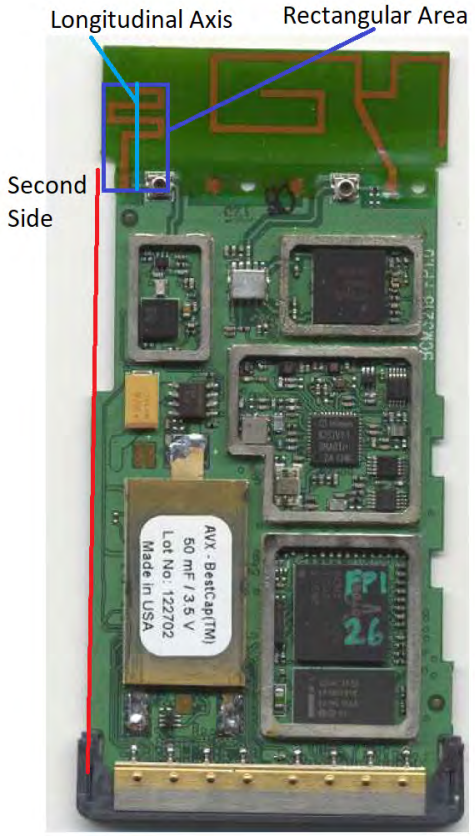
Fractus Exhibit 2003
Fractus v. Geotab
Page 499 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		

Fractus Exhibit 2003
Fractus v. Geotab
Page 500 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		
Claim 2		
2	The wireless handheld or portable device according to claim 1, wherein the second	Sony Ericsson GC79 expressly or inherently discloses this claim element.

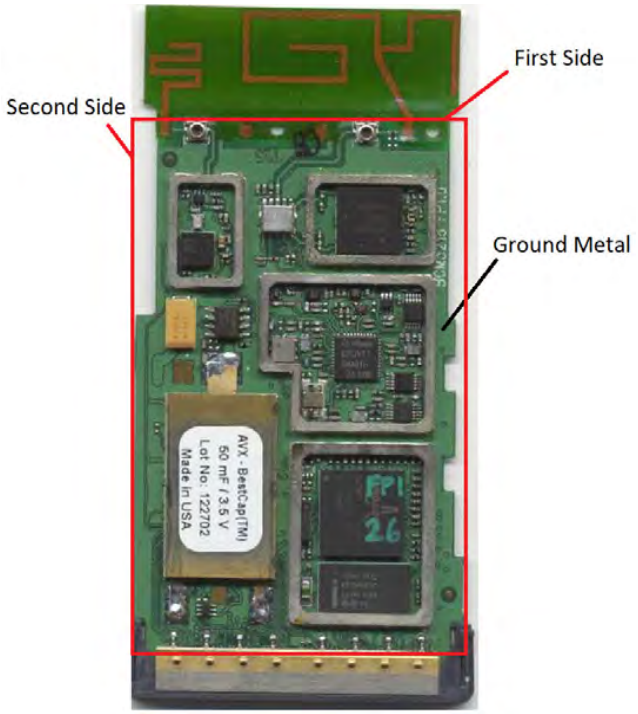
Fractus Exhibit 2003
Fractus v. Geotab
Page 501 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
	antenna is arranged substantially close to the second side.	*See, e.g.*, The second antenna of the Sony Ericsson GC79 is arranged substantially close to the second side.  *See* FCC Internal Photos at 1 (annotated).

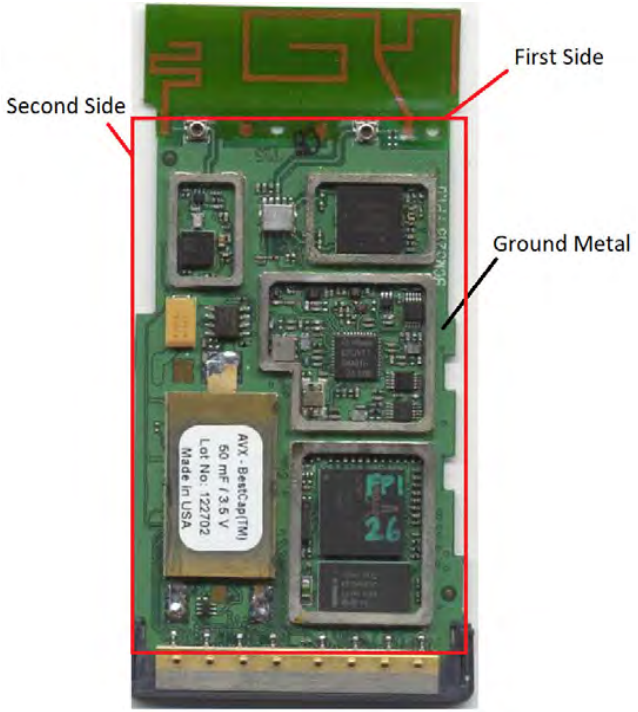
Fractus Exhibit 2003
Fractus v. Geotab
Page 502 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
Claim 3		
3	The wireless handheld or portable device according to claim 2, wherein the second antenna is arranged substantially close to a corner of the rectangular area.	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the Sony Ericsson is arranged substantially close to a corner of the rectangular area. The second antenna is substantially close to a corner where the first side meets the second side.

Fractus Exhibit 2003
Fractus v. Geotab
Page 503 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated).
Claim 4		
4	The wireless handheld or portable device according to claim 1, wherein the first antenna is arranged	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*,

Fractus Exhibit 2003
Fractus v. Geotab
Page 504 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
	substantially close to a corner of the rectangular area.	The first antenna of the Sony Ericsson GC79 is arranged substantially close to a corner of the rectangular area. The first antenna is substantially close to a corner where the first side meets the side that is opposite the second side.  *See* FCC Internal Photos at 1 (annotated).

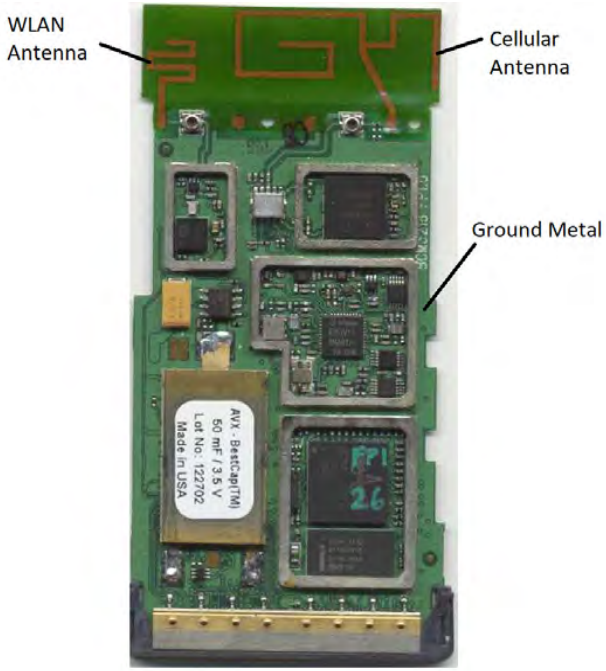
Fractus Exhibit 2003
Fractus v. Geotab
Page 505 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
	Claim 7	
7	The wireless handheld or portable device according to claim 1, wherein the at least one frequency band used for wireless connectivity services corresponds to at least one wireless connectivity service selected from the group comprising: BluetoothTM, IEEE802.11a, IEEE802.11 b, IEEE802.11g, WLAN, WiFi, UWB, ZigBee, GPS, Galileo, SDARs, XDARS, WiMAX, DAB, FM, DVB-H, and DMB.	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, In the Sony Ericsson GC79, the at least one frequency band used for wireless connectivity services corresponds to IEEE802.11b. **1.5 Test item** Manufacturer : Applicant Marketing Name : GC79 Model No. : GC79 Host Laptop Model : Dell Inspiron 8500 Description : GSM triband (900/1800/1900) & 802.11b PCMCIA card FCC-ID : PY7F1021011 **Additional information** Frequency : 2412MHz – 2462MHz for 802.11b *See* FCC GSM Test Report at 3. **1.5 Test item** Type of equipment : **Triple Band Mobile with integrated Bluetooth module** Type designation : **NPL-1 with DCH-8D, ACP-12E** Manufacturer : applicant Street : City : Country : Serial number : See photographs **Additional informations: :** Frequency : 2400 – 2483.5 MHz Type of modulation : 1M00FXD / 79M8FXD (FHSS) Number of channels : 79 Antenna : integral antenna / print antenna Power supply : 3.6V DC Li-polymer Battery Output power : EIRP: 2.04mW Temperature range :

Fractus Exhibit 2003
Fractus v. Geotab
Page 506 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		See FCC WLAN Test Report at 3.
Claim 8		
8[pre]	A portable device comprising:	To the extent the preamble is limiting, Sony Ericsson GC79 expressly or inherently discloses this claim element. *See* Claim 1[pre].
8[a]	a ground plane;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See* Claim 1[a].
8[b]	a first antenna configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The Sony Ericsson GC79 includes a first antenna (cellular antenna, labeled below) configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands.

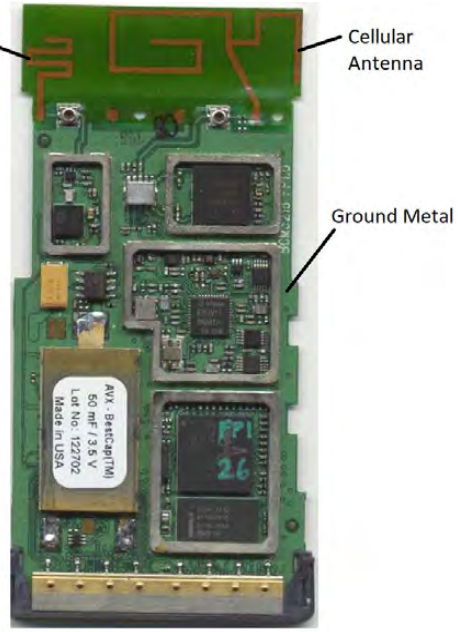
Fractus Exhibit 2003
Fractus v. Geotab
Page 507 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated). The first antenna of the Sony Ericsson GC79 is configured to transmit and receive electromagnetic waves corresponding to at least three frequency bands: **1.5 Test item** Manufacturer : Applicant Marketing Name : GC79 Model No. : GC79 Host Laptop Model : Sony Viao (S/No. 28305630 3208479) Description : GSM triband (900/1800/1900) & 802.11b PCMCIA card FCC-ID : PY7F1021011

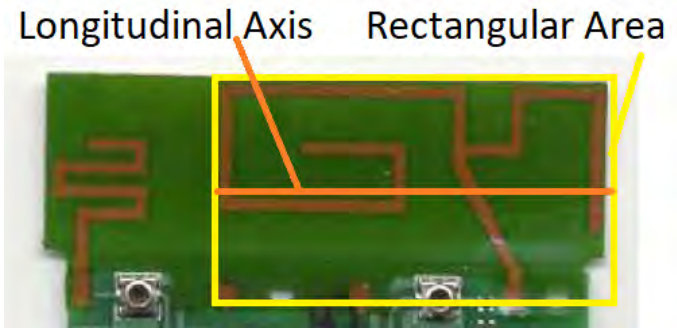
Fractus Exhibit 2003
Fractus v. Geotab
Page 508 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		See FCC GSM Test Report at 3. The at least three frequency bands are used for GSM mobile communication services.
8[c]	the at least three frequency bands being used for mobile communication services;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See* Claim 8[b].
8[d]	a second antenna configured to operate in at least one frequency band;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The Sony Ericsson GC79 has a second antenna (WLAN antenna, labeled below) configured to operate in at least one frequency band.

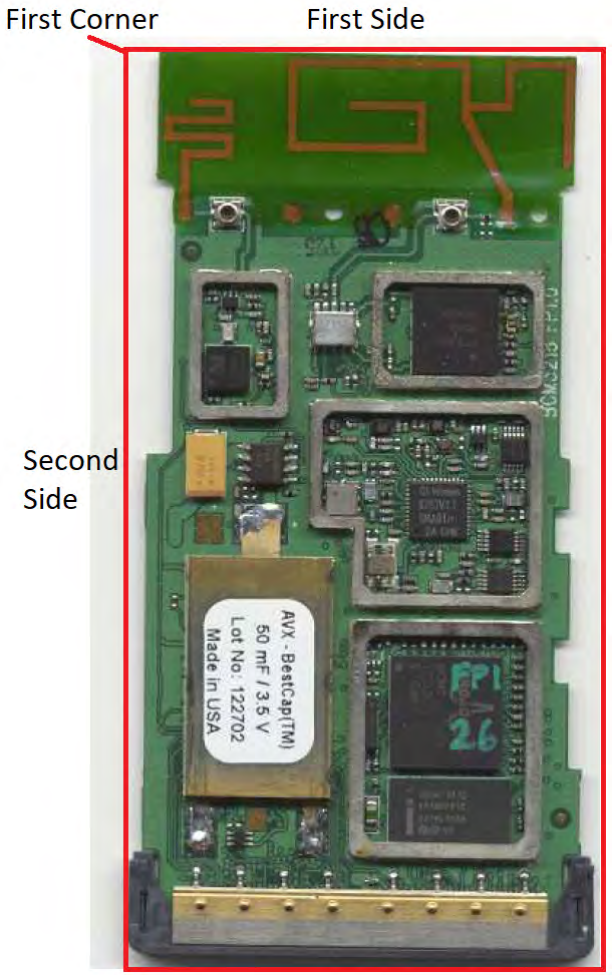
Fractus Exhibit 2003
Fractus v. Geotab
Page 509 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated). The second antenna of the Sony Ericsson GC79 is configured to receive electromagnetic waves corresponding to at least one frequency band from 2412 MHz to 2462 MHz: **1.5 Test item** Manufacturer : Applicant Marketing Name : GC79 Model No. : GC79 Host Laptop Model : Dell Inspiron 8500 Description : GSM triband (900/1800/1900) & 802.11b PCMCIA card FCC-ID : PY7F1021011 **Additional information** Frequency : 2412MHz – 2462MHz for 802.11b

Fractus Exhibit 2003
Fractus v. Geotab
Page 510 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		See FCC WLAN Test Report at 3.
8[e]	the first antenna extends in a direction substantially parallel to a first side of the portable device;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Sony Ericsson GC79 extends in a direction substantially parallel to a first side of the Sony Ericsson GC79.  *See* FCC Internal Photos at 1 (cropped, annotated). The radiating element is inscribed in the red rectangular area, and the longitudinal axis of symmetry of the rectangular area is shown as a red line.

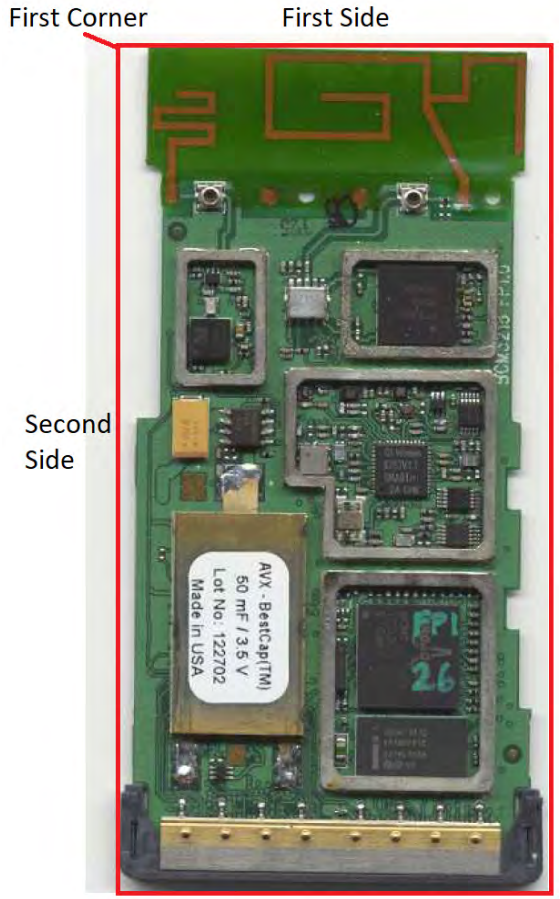
Fractus Exhibit 2003
Fractus v. Geotab
Page 511 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated).

Fractus Exhibit 2003
Fractus v. Geotab
Page 512 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, A length of a second side of the Sony Ericsson GC79 is longer than a length of the first side of the portable device.

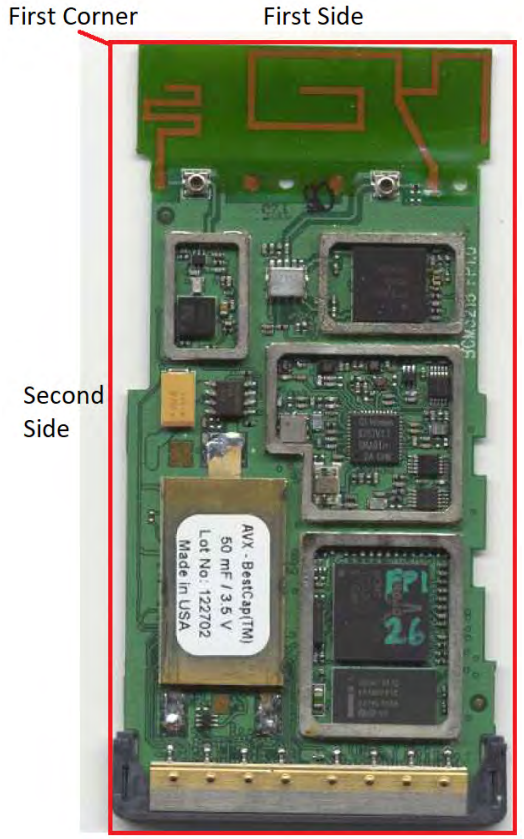
Fractus Exhibit 2003
Fractus v. Geotab
Page 513 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated).

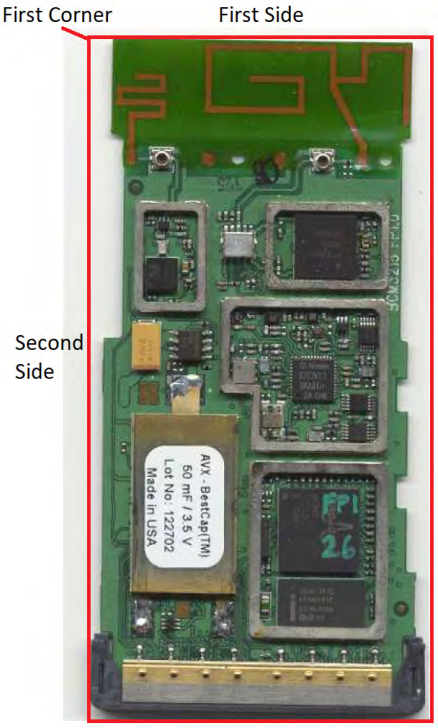
Fractus Exhibit 2003
Fractus v. Geotab
Page 514 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The first antenna of the Sony Ericsson GC79 is arranged substantially close to the first side of the Sony Ericsson GC79.

Fractus Exhibit 2003
Fractus v. Geotab
Page 515 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated).

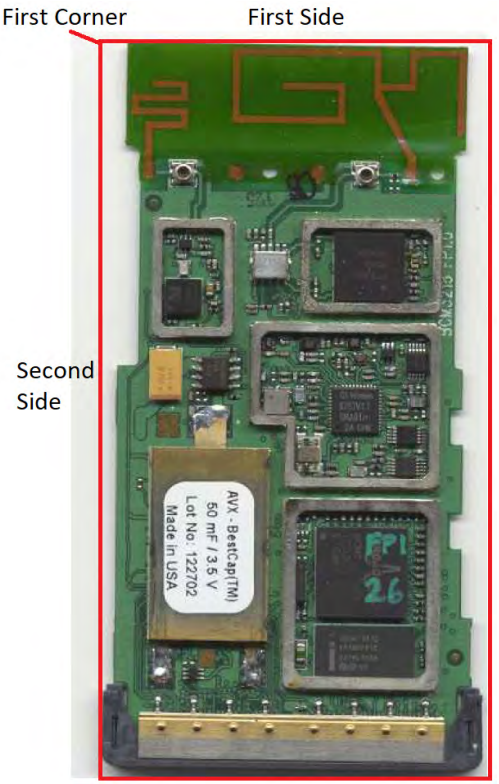
Fractus Exhibit 2003
Fractus v. Geotab
Page 516 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The second antenna of the Sony Ericsson GC79 is arranged substantially close to a first corner of the Sony Ericsson GC79.  *See* FCC Internal Photos at 1 (annotated).

Fractus Exhibit 2003
Fractus v. Geotab
Page 517 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, The first corner of the Sony Ericsson GC79 corresponds to a first end of the first side with an end of the second side of the Sony Ericsson GC79.

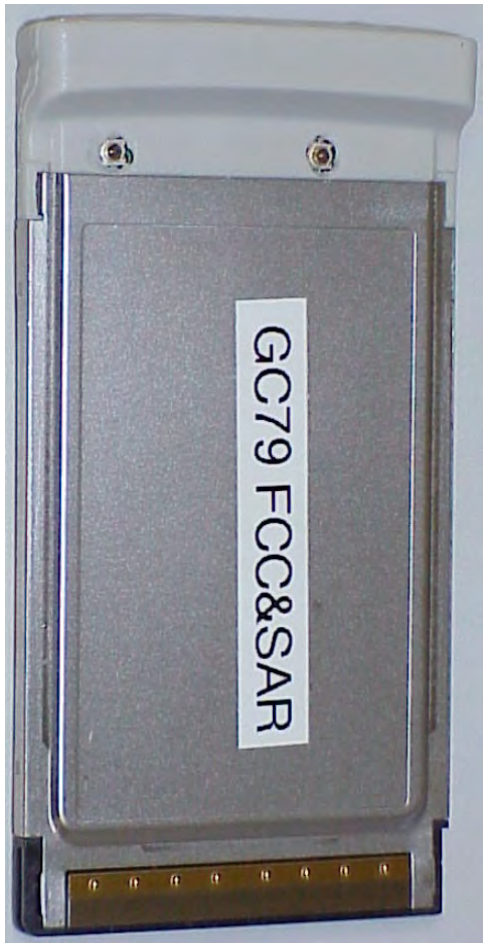
Fractus Exhibit 2003
Fractus v. Geotab
Page 518 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated).
8[j]	the first antenna and the second antenna are located	Sony Ericsson GC79 expressly or inherently discloses this claim element.

Fractus Exhibit 2003
Fractus v. Geotab
Page 519 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
	internally within the portable device.	*See, e.g.*, The first antenna and the second antenna of the Sony Ericsson GC79 are located internally within the Sony Ericsson GC79.

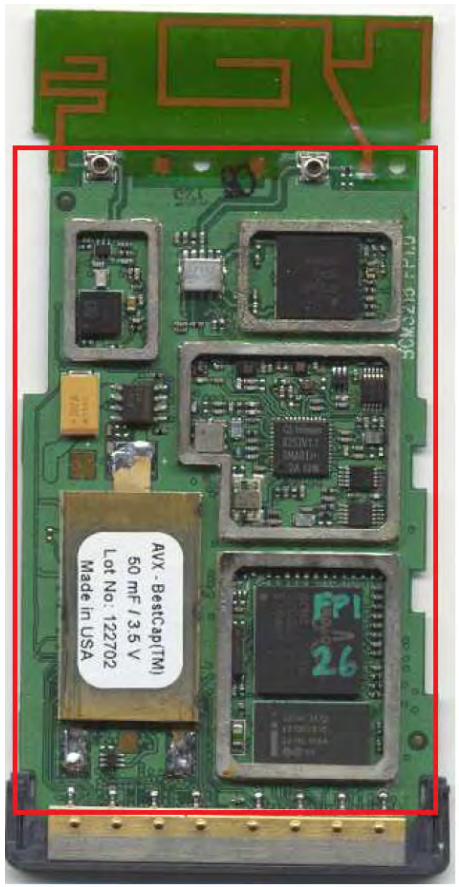
Fractus Exhibit 2003
Fractus v. Geotab
Page 520 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		

Fractus Exhibit 2003
Fractus v. Geotab
Page 521 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
Claim 9		
9	The portable device according to claim 8, wherein a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.	Sony Ericsson GC79 expressly or inherently discloses this claim element. *See, e.g.*, In the Sony Ericsson GC79, a portion of an orthogonal projection of the first antenna on a plane containing the ground plane does not overlap with the ground plane.

Fractus Exhibit 2003
Fractus v. Geotab
Page 522 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		 *See* FCC Internal Photos at 1 (annotated).

Fractus Exhibit 2003
Fractus v. Geotab
Page 523 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
	Claim 11	
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	Sony Ericsson GC79 expressly or inherently discloses this claim element. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. It would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading. ***See, e.g.*, Sato** at [0040] – [0041]: "The triple-band antenna 74 is used to transmit or receive GSM, DCS, and PCS signals. The high-frequency switch 64 outputs the GSM, DCS, and PCS signals received by the triple-band antenna 74 to the reception section 10 and outputs the GSM, DCS, and PCS signals output from the transmission section 20 to the triple-band antenna 74. The UMTS antenna 72 is used to transmit or receive a UMTS (WCDMA) signal. The duplexer 62 outputs the UMTS (WCDMA) signal received by the UMTS antenna 72 to the reception section 10 and outputs the UMTS (WCDMA) signal output from the transmission section 20 to the UMTS antenna 72. That is to say, the duplexer 62 separates a transmission signal from a reception signal. Since UMTS (WCDMA) assumes continuous transmission and reception, the duplexer 62 is used instead of a switch." ***See also, e.g.*, Talvitie** at [0022], [0024], [0026], [0037]:

Fractus Exhibit 2003
Fractus v. Geotab
Page 524 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Sony Ericsson GC79
		"FIG. 1 shows a planar antenna structure called a PIFA (Planar Inverted F Antenna) antenna structure 100 comprising a ground plane 110, a first radiator 120, and a second radiator 130." "the groove plane antenna is configured to radiate at least within one lower frequency range and within one or more higher frequency ranges…" "An example of a multifrequency mobile station configured to support MGSP 900 (880 to 960 MHz), GSM 1900 (1850 to 1990 MHz), WCDMA 2000 (1920 to 2170 MHz) systems and frequency ranges." "It is also possible to configure all GSM functionalities in one antenna A1 and, similarly, all WCDMA functionalities (transmission and reception) in another antenna A2 by means of a duplex filter…the strong isolation between the antennas reduces power losses between the antennas in such a configuration as well; this, again, preferably cuts down thermal losses and power consumption of the mobile station."

Fractus Exhibit 2003
Fractus v. Geotab
Page 525 of 563

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 8,810,458 B2
BASED ON NOKIA 6630 ("NOKIA 6630")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendants' accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious some or all of claims 8 and 11 (the "'458 Asserted Claims")[1]. These invalidity contentions are not an admission by the Defendants that the accused products are covered by or infringe the asserted claims, particularly when these claims are properly construed and applied.

Pre-AIA law applies because the application that issued as the '458 Patent was filed on December 18, 2012, before the AIA came into force on March 16, 2013.

Nokia Corporation's ("Nokia") Nokia 6630, as publicly demonstrated, known, offered for sale, sold and/or used by Nokia and/or customers of Nokia, or otherwise available to the public, including in this country ("Nokia 6630") was reduced to practice by Nokia engineers no later than June 14, 2004, offered for sale no later than November 2004, and publicly demonstrated at conferences open to the public no later than March 2005. Thus, the Nokia 6630 is available as prior art at least under 35 U.S.C. § 102(a), and 103(a). At least the following documents provide evidence as to the date the Nokia 6630 was "offered for sale or publicly used or known," "the date the offer or use of the item took place or the information became known", and the "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" [2]:

- *Nokia 6630 Service Schematics*, Nokia Corporation, November 3, 2004, retrieved from https://elektrotanya.com/nokia-6630.pdf/download.html ("Nokia Schematics").

[1] Defendants understand that, by not charting claims 5-6, 10, 12-13, and 16, 18-20 in its Infringement Contentions, Plaintiff does not assert these claims against Defendants.
[2] Defendants incorporate herein any related work performed by or on behalf of an author or an inventor in the United States under 35 U.S.C. § 102(g). Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery. Defendants anticipate that the actual dates, circumstances, and identities of individuals will be the subject of third party discovery during this lawsuit. Defendants therefore reserve the right to amend and/or supplement their Invalidity Contentions and this chart if additional information becomes available during the course of discovery. The date the Nokia 6630 was "offered for sale or publicly used or known," as well as "the date the offer or use of the item took place or the information became known" is at least as early as the dates identified in the published documents. The "identity of the person or entity which made the use or which made and received the offer, or the person or entity which made the information known or to whom it was made known" includes at least those persons associated with the publication(s), press releases, and conference attendees, or other documents associated with each version on the Nokia 6630. Defendants also reserve the right to rely on the public use, offer for sale, sale, or installation of the devices described in the publications identified herein once Defendants have had a fair opportunity to take discovery on these subjects.

Fractus Exhibit 2003
Fractus v. Geotab
Page 526 of 563

- *Nokia 6630 Ringtones, Games, Camera, Disassembly*, SmerFon, July 5, 2020, retrieved from https://www.youtube.com/watch?v=F1jj-0Qp-Rw ("Nokia Breakdown").
- *Nokia 6630 User Manual*, Nokia Corporation, 2005, retrieved from https://www.manualslib.com/manual/112179/Nokia-6630.html ("Nokia Manual").
- *Nokia 6630*, Mobile Phone Museum, retrieved from https://www.mobilephonemuseum.com/phone-detail/nokia-6630 ("Nokia Archive").
- *Nokia goes full speed ahead with world's smallest 3G megapixel phone*, Nokia Press Release, June 14, 2004, retrieved from https://web.archive.org/web/20140714204030/http://company.nokia.com/en/news/press-releases/2004/06/14/nokia-goes-full-speed-ahead-with-worlds-smallest-3g-megapixel-phone ("Nokia Press").
- *Culture of "Remix" Celebrated at the 2005 O'Reilly Emerging Technology Conference*, O'Reilly News Blog, April 4, 2005, retrieved from https://app.oreilly.com/pub/pr/1323 ("ETC Blog").
- Wayback Machine Capture of the URL http://conferences.oreillynet.com/etech/, Internet Archive, March 9, 2005, retrieved from https://web.archive.org/web/20050309025628/http:/conferences.oreillynet.com/etech/ ("ETC Archive").

As described in the following claim chart, some or all of the asserted claims of U.S. Patent No. 8,810,458 (the "'458 Patent"), are invalid as anticipated by Nokia 6630. To the extent that Nokia 6630 is found not to anticipate one or more of the asserted claims of the '458 Patent, these claims are invalid as obvious in view of Nokia 6630 alone or as modified in view of or in combination with other prior art references disclosed in Defendants' Invalidity Contentions and accompanying charts.

One of ordinary skill in the art, as of the priority date of the '458 Patent, would have known to combine or modify the prior art elements disclosed by the foregoing references using known methods, and to use these elements according to their established functions in order to achieve a known and predictable result.

These invalidity contentions are not an admission that the Defendants concede or acquiesce to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor are Defendants asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature. Defendants retain the right to update their constructions and contentions in view of this Court's claim construction order.[3]

[3] Defendants reserve the right to supplement and/or alter this chart based on further investigation and ongoing discovery.

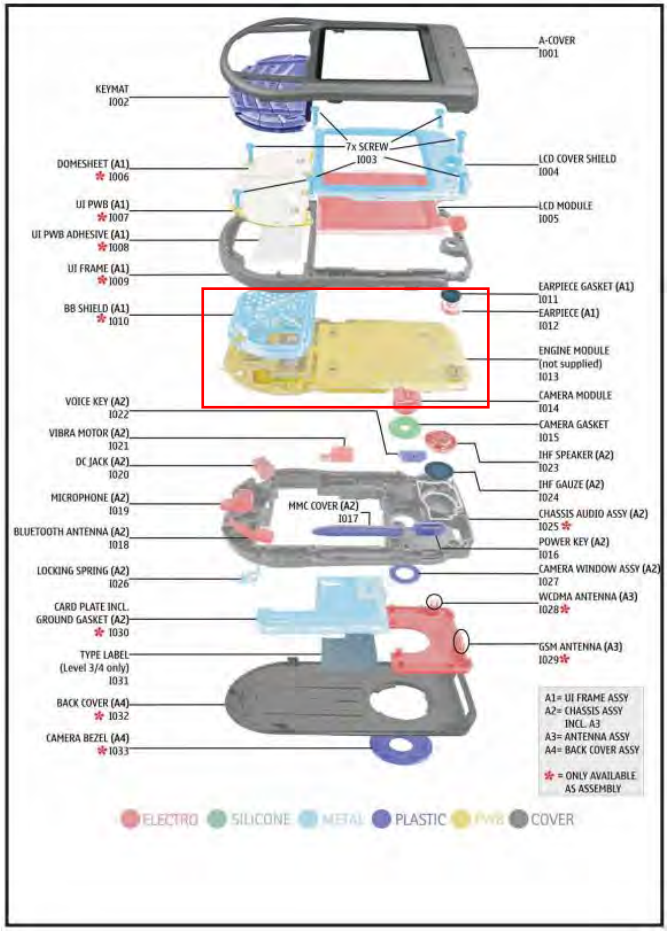
Fractus Exhibit 2003
Fractus v. Geotab
Page 527 of 563

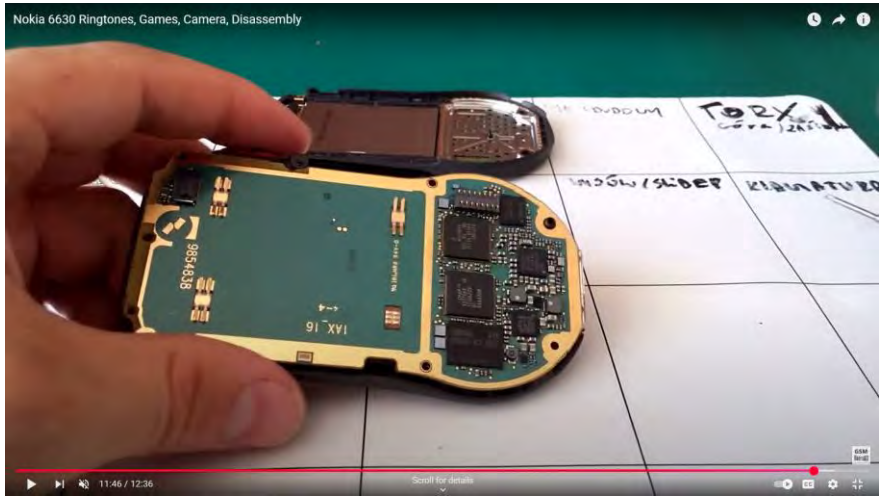
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
	Claim 8		
8[pre]	A portable device comprising:	To the extent the preamble is limiting, Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*, Nokia Schematics at 1:  Nokia Manual at 9:	*Does NOT include "wireless handheld" of claim 1.* *See* Infringement Contentions, *e.g.* Claim Charts for different examples of mapping to claim 8, *e.g.,* *VT-400 infringes claims 1, 2, 4, 7, 8, 9;* *VT-410 infringes claims 8-9, 11;* *CalAmpLMU-3040MB infringes claims 8-9, 11;*

Fractus Exhibit 2003
Fractus v. Geotab
Page 528 of 563

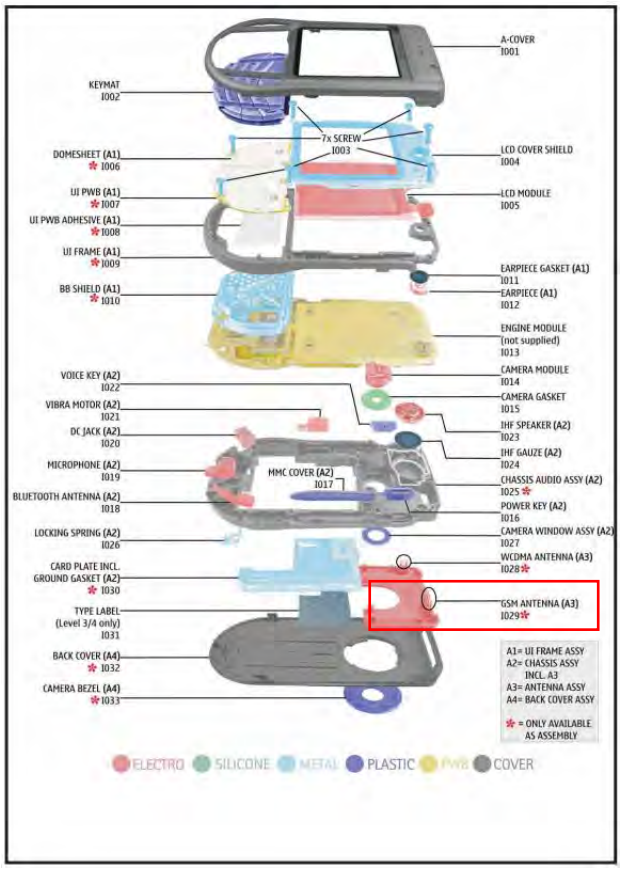
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		The wireless device described in this guide is approved for use on the EGSM 900/1800/1900, and UMTS 2000 network. Contact your service provider for more information about networks. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	
8[a]	a ground plane;	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*, Nokia Schematics at 1 (showing with red box the ground plane layer):	*See* '458 Patent, 10:13-15, 10:32-33: "ground-plane" of "handheld device" or "handset" is "normally" "a conductive layer of the PCB".

Fractus Exhibit 2003
Fractus v. Geotab
Page 529 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 Nokia Breakdown at Timestamp = 11:46:	

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	
8[b]	a first antenna configured to transmit and receive	Nokia 6630 expressly or inherently discloses this claim element.	

Fractus Exhibit 2003
Fractus v. Geotab
Page 531 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
	electromagnetic waves corresponding to at least three frequency bands;	*See, e.g.*, Nokia Schematics at 1 (showing with red box the first "GSM antenna"): 	

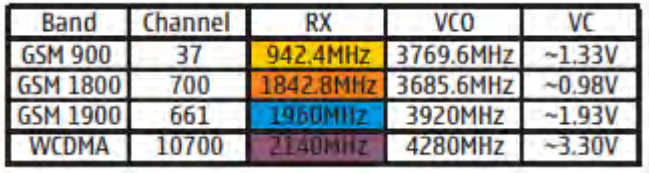
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		Nokia Schematics at 10 (showing electrical diagram of antennas and containing chart noting that the "GSM antenna" has three frequency bands): Band / Channel / RX / VCO / VC GSM 900 / 37 / 942.4MHz / 3769.6MHz / ~1.33V GSM 1800 / 700 / 1842.8MHz / 3685.6MHz / ~0.98V GSM 1900 / 661 / 1960MHz / 3920MHz / ~1.93V WCDMA / 10700 / 2140MHz / 4280MHz / ~3.30V Nokia Breakdown at Timestamp = 12:12:  Nokia Manual at 9:	

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		The wireless device described in this guide is approved for use on the EGSM 900/1800/1900, and UMTS 2000 network. Contact your service provider for more information about networks. Nokia Manual at 97: When you are using your phone in GSM and UMTS networks it is possible to have multiple data connections active at the same time; access points can share a data connection; and data connections remain active (for example, during voice calls). For information on how to see how many data connections are active, see Connection manager, p. '91'. See also network indicators in Essential indicators, p. '15'. The following indicators may appear below the signal indicator, depending on which network you are using:	

Fractus Exhibit 2003
Fractus v. Geotab
Page 534 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 - GSM network, packet data is available in the network.  - GSM network, packet data connection is active, data is being transferred.  - GSM network, multiple packet data connections are active.  - GSM network, packet data connection is on hold. (This can happen during a voice call, for example.)  - UMTS network, packet data is available in the network.  - UMTS network, packet data connection is active, data is being transferred.  - UMTS network, multiple packet data connections are active.  - UMTS network, packet data connection is on hold. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	
8[c]	the at least three frequency bands being used for mobile communication services;	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*,	For "mobile communication services", *see*

Fractus Exhibit 2003
Fractus v. Geotab

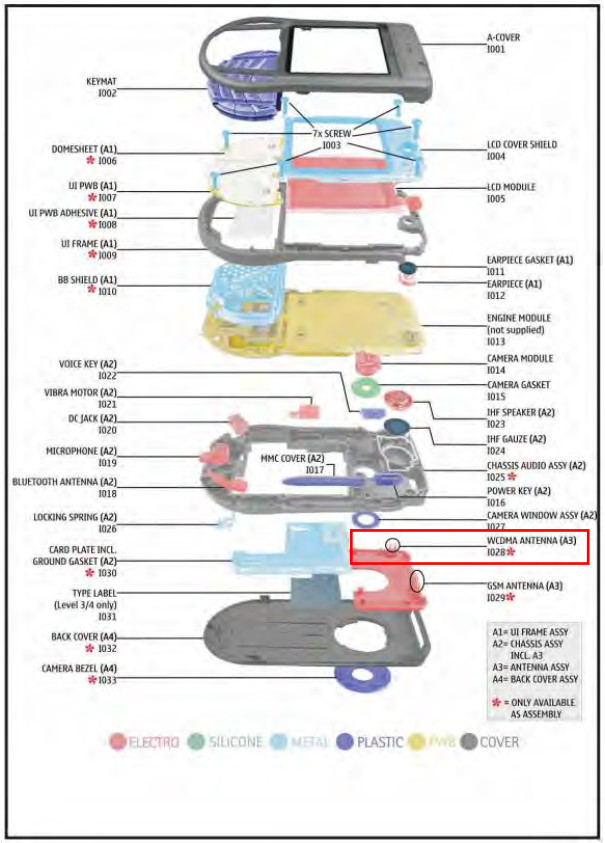
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		Nokia Schematics at 10 (containing chart noting that the "GSM antenna" has three frequency bands used for mobile communication services):  Nokia Manual at 9: The wireless device described in this guide is approved for use on the EGSM 900/1800/1900, and UMTS 2000 network. Contact your service provider for more information about networks. Nokia Manual at 97: When you are using your phone in GSM and UMTS networks it is possible to have multiple data connections active at the same time; access points can share a data connection; and data connections remain active (for example, during voice calls). For information on how to see how many data connections are active, see Connection manager, p. '91'. See also network indicators in Essential indicators, p. '15'. The following indicators may appear below the signal indicator, depending on which network you are using:	'458 Pat. at 9:26-43.

Band	Channel	RX	VCO	VC
GSM 900	37	942.4MHz	3769.6MHz	~1.33V
GSM 1800	700	1842.8MHz	3685.6MHz	~0.98V
GSM 1900	661	1960MHz	3920MHz	~1.93V
WCDMA	10700	2140MHz	4280MHz	~3.30V

Fractus Exhibit 2003
Fractus v. Geotab
Page 536 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 - GSM network, packet data is available in the network.  - GSM network, packet data connection is active, data is being transferred.  - GSM network, multiple packet data connections are active.  - GSM network, packet data connection is on hold. (This can happen during a voice call, for example.)  - UMTS network, packet data is available in the network.  - UMTS network, packet data connection is active, data is being transferred.  - UMTS network, multiple packet data connections are active.  - UMTS network, packet data connection is on hold. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	
8[d]	a second antenna configured to operate in at least one frequency band;	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*,	*Compared to claim elements [1f] and 1[g], element 8[d] only*

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		Nokia Schematics at 1 (showing with red box the second "WCDMA antenna"):  	*requires "…operate in…", does not require "…receive electromagnetic waves corresponding to…", AND, unlike 1[g] and claim 7, there is NO requirement in element 8[d] that the "at least one frequency band" be "used for wireless connectivity services". Rather, in asserted claim 11, the second antenna is for a different "mobile communication service" (see '458 Pat. at 9:26-43) than any of the 3*

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		Nokia Schematics at 10 (showing electrical diagram of antennas and containing chart noting that the "WCDMA antenna" has one frequency bands): Band / Channel / RX / VCO / VC GSM 900 / 37 / 942.4MHz / 3769.6MHz / ~1.33V GSM 1800 / 700 / 1842.8MHz / 3685.6MHz / ~0.98V GSM 1900 / 661 / 1960MHz / 3920MHz / ~1.93V WCDMA / 10700 / 2140MHz / 4280MHz / ~3.30V Nokia Breakdown at Timestamp = 12:12:  Nokia Manual at 9:	*bands of element 8[c].*

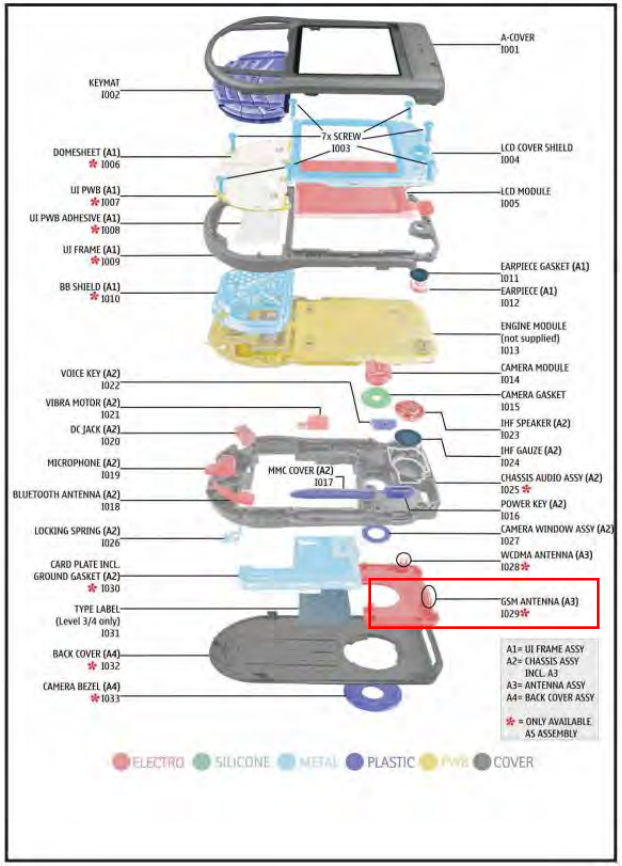
Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		The wireless device described in this guide is approved for use on the EGSM 900/1800/1900, and UMTS 2000 network. Contact your service provider for more information about networks. Nokia Manual at 97: When you are using your phone in GSM and UMTS networks it is possible to have multiple data connections active at the same time; access points can share a data connection; and data connections remain active (for example, during voice calls). For information on how to see how many data connections are active, see Connection manager, p. '91'. See also network indicators in Essential indicators, p. '15'. The following indicators may appear below the signal indicator, depending on which network you are using:	

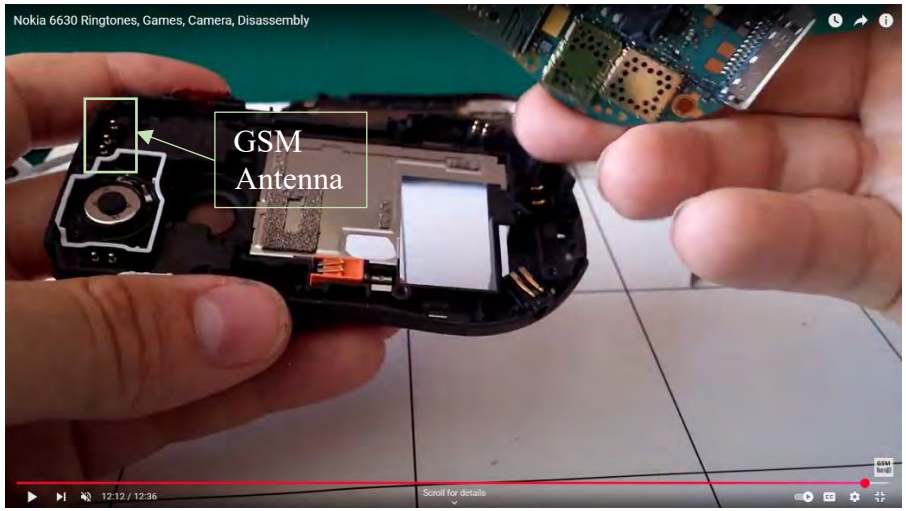
Fractus Exhibit 2003
Fractus v. Geotab
Page 540 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 - GSM network, packet data is available in the network.  - GSM network, packet data connection is active, data is being transferred.  - GSM network, multiple packet data connections are active.  - GSM network, packet data connection is on hold. (This can happen during a voice call, for example.)  - UMTS network, packet data is available in the network.  - UMTS network, packet data connection is active, data is being transferred.  - UMTS network, multiple packet data connections are active.  - UMTS network, packet data connection is on hold. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	
8[e]	the first antenna extends in a direction substantially parallel	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*,	*Note: Element 8[e] recites "substantially parallel to a first*

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
	to a first side of the portable device;	Nokia Schematics at 1 (showing with red box the first "GSM antenna" which runs parallel to the top (i.e., "first side") of the portable device):  	*side of* ***the portable device****" while element 1[h] is "substantially parallel to the first side [of the rectangular area in which the ground plane is inscribed".* For meaning of "substantially parallel", *see* '458 Pat. at 10:42-44, 17:10-12 ("two directions are considered to be substantially parallel if they form an angle of less than or equal to approximately 30 degrees.") *See also* Infringement Contentions, *e.g.*

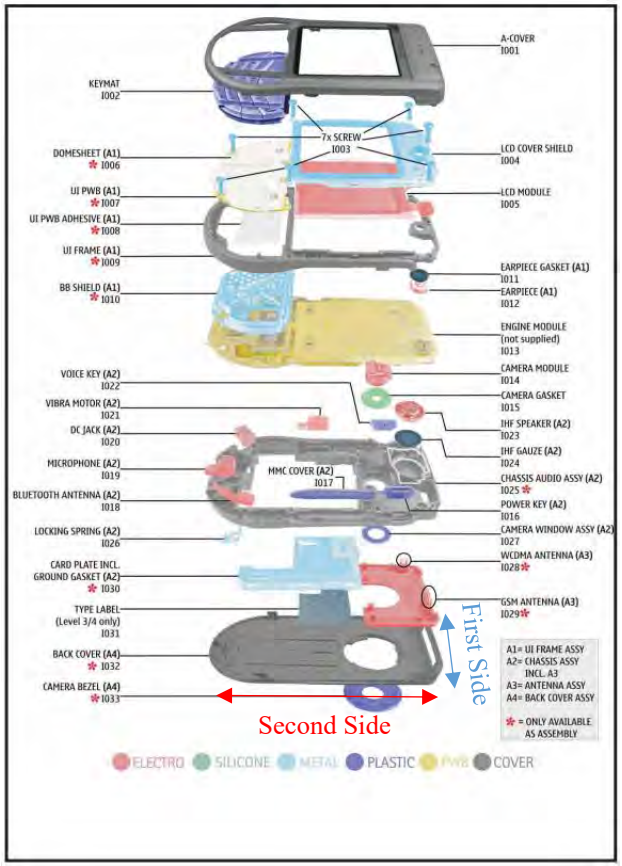
Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		Nokia Breakdown at Timestamp = 12:12:  To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	Claim Charts for (showing varying shapes of first antenna): *VT-400;* *VT-410;* *CalAmpLMU-3040MB;* etc.

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
8[f]	a length of a second side of the portable device is greater than a length of the first side of the portable device;	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*, Nokia Schematics at 1 (showing "first side" in blue and "second side" in red, wherein the "second side" is greater in length than the "first side"):	*Note: In elements 8[e], 8[f], 8[g], 8[i], the "first side" and "second side" are of "**the portable device**" while, in elements 1[h], 1[i], 1[j], claim 2, the "first side" and "second side" are of the rectangular area in which the ground plane is inscribed.*

Fractus Exhibit 2003
Fractus v. Geotab
Page 544 of 563

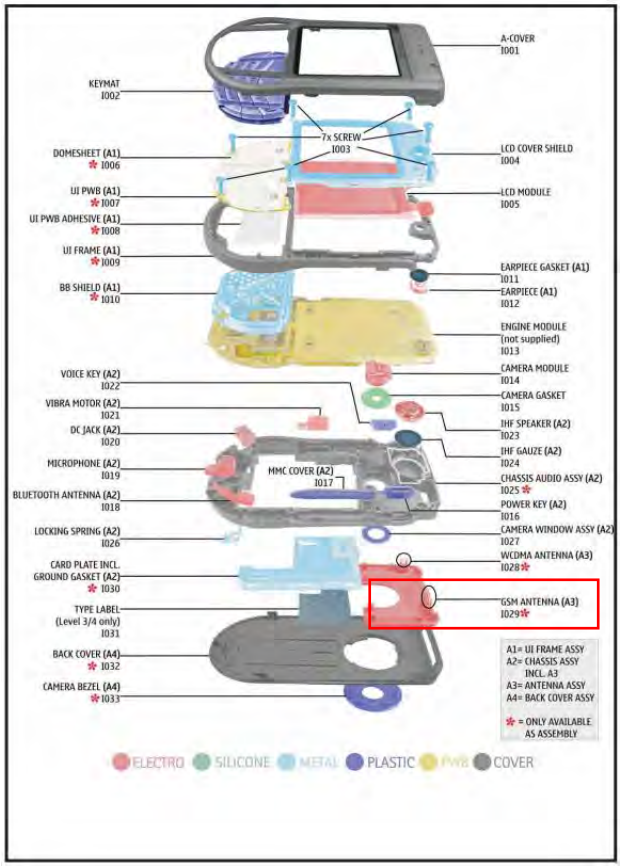
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 Nokia Breakdown at Timestamp = 12:12:	

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	

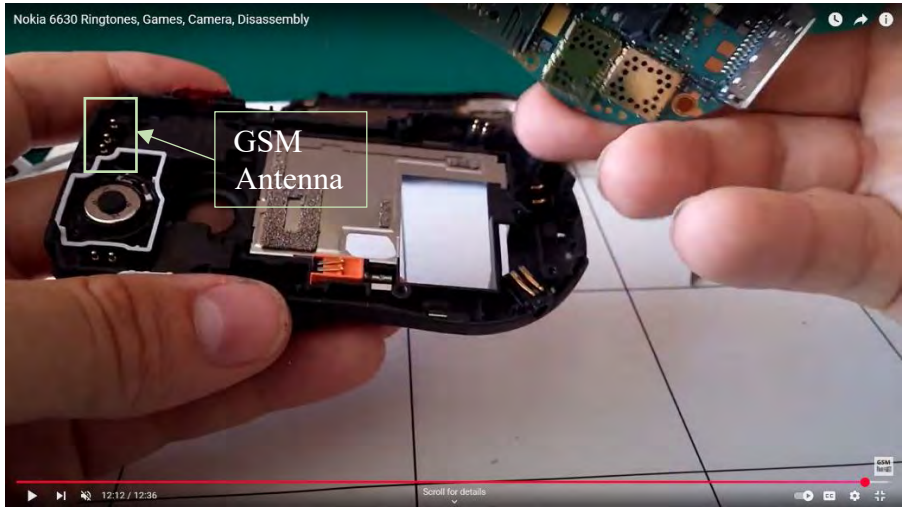
Fractus Exhibit 2003
Fractus v. Geotab
Page 546 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
8[g]	the first antenna is arranged substantially close to the first side of the portable device;	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*, Nokia Schematics at 1 (showing with red box the first "GSM antenna" which is arranged "substantially close" to the top (i.e., "first side") of the portable device):	*Note: Element 8[g] recites "substantially close to the first side of* ***the portable device****" while element 1[j] is "substantially close to the first side [of the rectangular area in which the ground plane is inscribed".* We will likely argue that "substantially close" is a term rendering the claims indefinite. '458 Pat. at FIGS. 23A-23B, 23:45-53, 14:1-4. *See* Infringement Contentions, *e.g.* Claim Charts for different

Fractus Exhibit 2003
Fractus v. Geotab
Page 547 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 Nokia Breakdown at Timestamp = 12:12:	examples of "substantially close" for element 8[g].

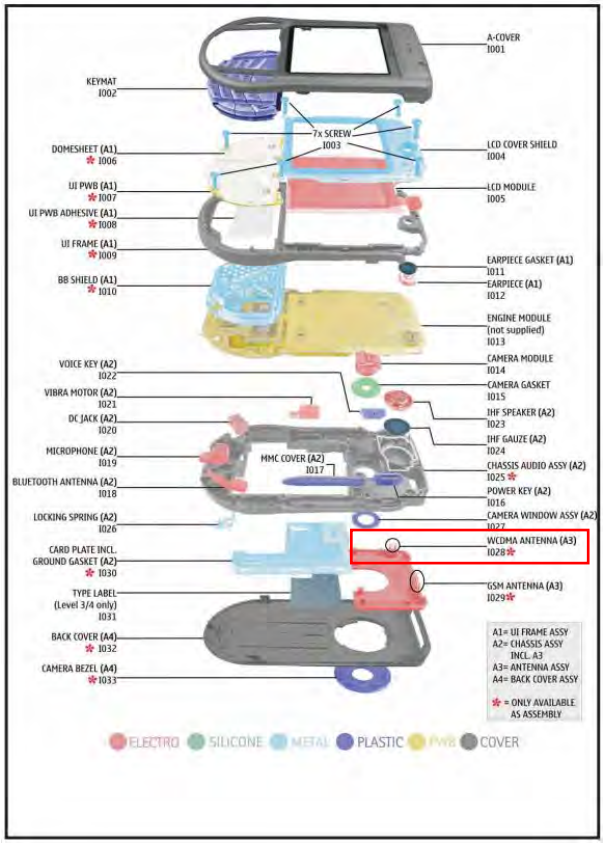
Fractus Exhibit 2003
Fractus v. Geotab
Page 548 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	

Fractus Exhibit 2003
Fractus v. Geotab
Page 549 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
8[h]	the second antenna is arranged substantially close to a first corner of the portable device;	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*, Nokia Schematics at 1 (showing with red box the second "WCDMA antenna," which is arranged "substantially close" to the top left corner (i.e., "a first corner") of the portable device):	*Note: Element 8[h] recites "substantially close to a first corner of* ***the portable device****" while claim 3 recites "substantially close to a corner of the rectangular area [in which the ground plane is inscribed".* We will likely argue that "substantially close" is a term rendering the claims indefinite. '458 Pat. at FIGS. 23A-23B, 23:45-53, 14:1-4. *See* Infringement Contentions, *e.g.* Claim Charts for different

Fractus Exhibit 2003
Fractus v. Geotab
Page 550 of 563

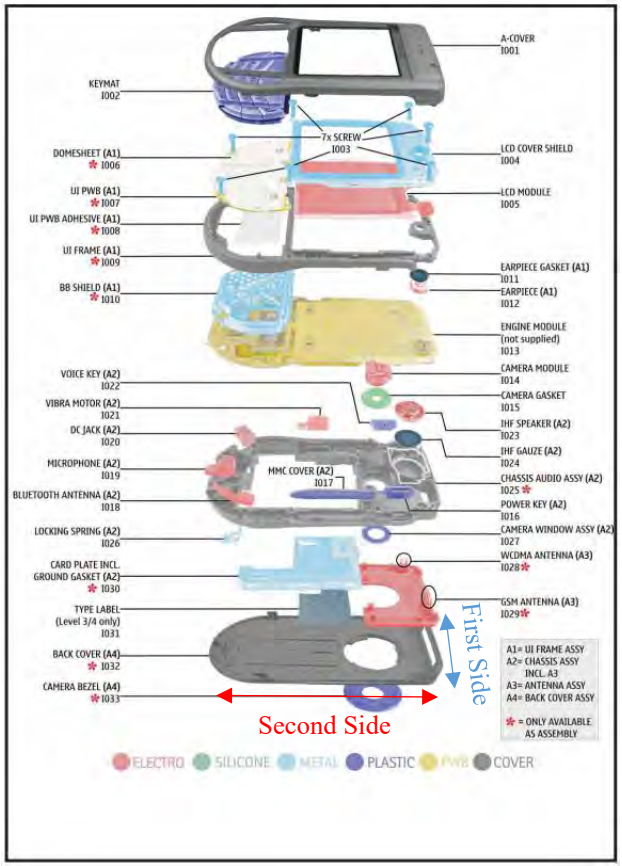
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 Nokia Breakdown at Timestamp = 12:12:	examples of "substantially close" for element 8[h].

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
8[i]	the first corner of the portable device corresponding to a first end of the first side [sic: intersecting] with an end of the second side of the portable device; and	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*, Nokia Schematics at 1 (showing "first side" in blue and "second side" in red, wherein the "first end of the first side" intersects with an "end of the second side" to form the "first corner"):	*Not explicitly in any of claims 1-4 or 7.* *See* Infringement Contentions, *e.g.* Claim Charts for different examples of mapping to element 8[i], *e.g.,* *VT-400;* *VT-410;* *CalAmpLMU-3040MB.*

Fractus Exhibit 2003
Fractus v. Geotab
Page 553 of 563

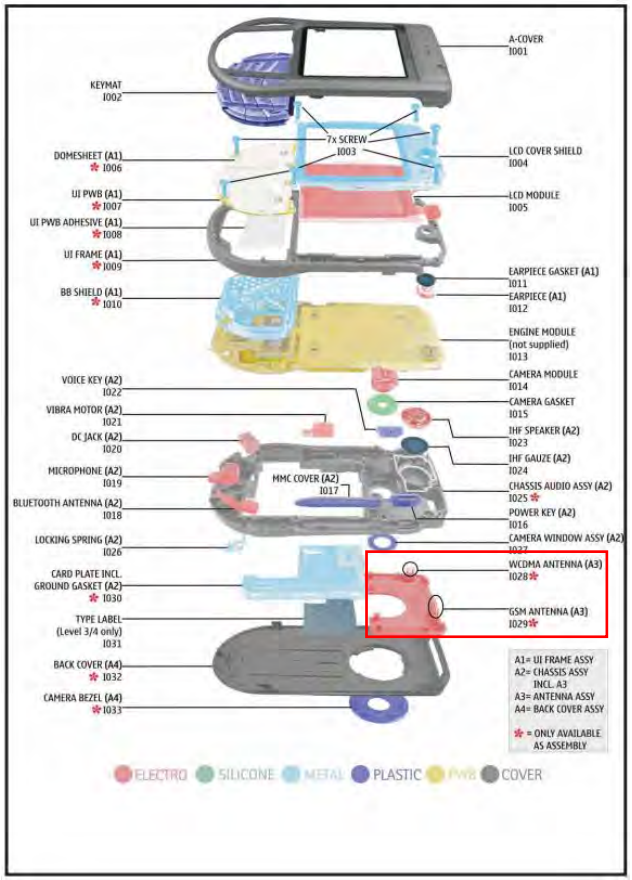
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 Nokia Breakdown at Timestamp = 12:12:	

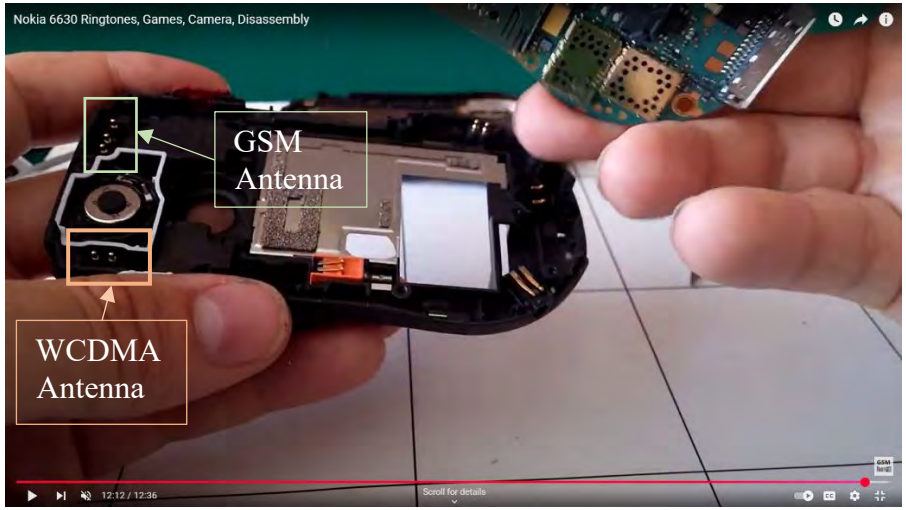
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	
8[j]	the first antenna and the second antenna are located	Nokia 6630 expressly or inherently discloses this claim element.	

Fractus Exhibit 2003
Fractus v. Geotab
Page 555 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
	internally within the portable device.	*See, e.g.*, Nokia Schematics at 1 (showing with red box the first "GSM antenna" and second "WCDMA antenna," which are located internally within the portable device):	

Fractus Exhibit 2003
Fractus v. Geotab
Page 556 of 563

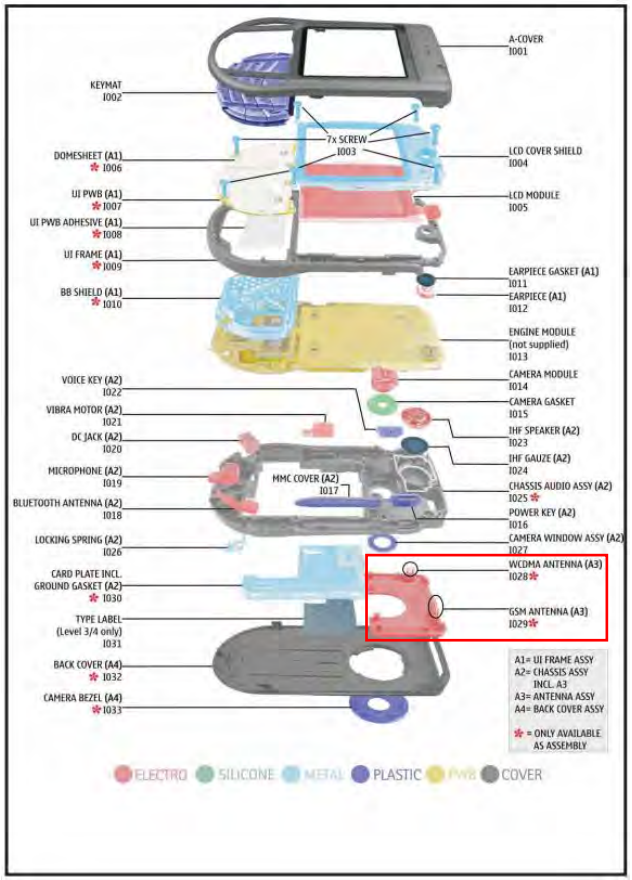
Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 Nokia Breakdown at Timestamp = 12:12:	

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	
Claim 11			

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
11	The portable device according to claim 8, wherein the at least one frequency band is used for a mobile communication service, and said at least one frequency band being different from the at least three frequency bands.	Nokia 6630 expressly or inherently discloses this claim element. *See, e.g.*, Nokia Schematics at 1 (showing with red box the first "GSM antenna" and second "WCDMA antenna"):	For "mobile communication services", *see* '458 Pat. at 9:26-43. *Unlike element 1[g] and claim 7, in asserted claim 11, the second antenna, and the "at least one frequency band", is for a different "mobile communication service" (see '458 Pat. at 9:26-43) than any of the 3 bands of element 8[c], and is NOT "used for wireless connectivity services".*

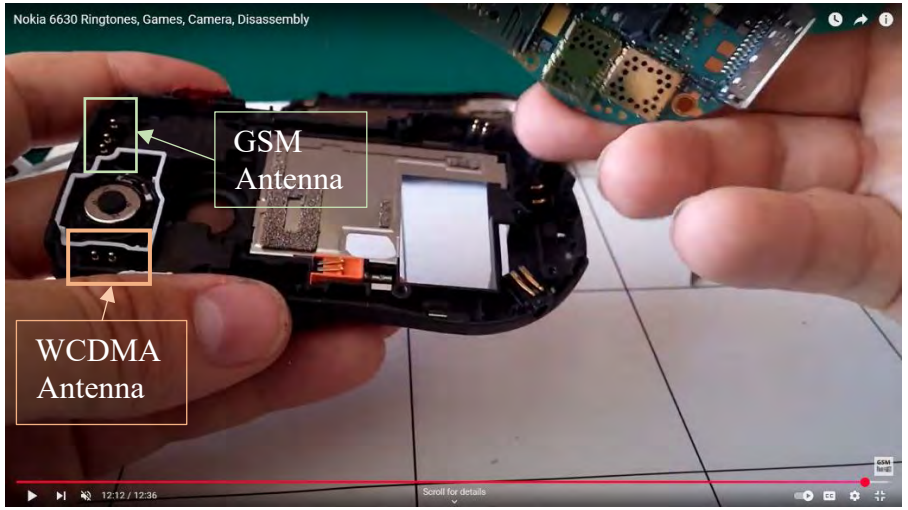
Fractus Exhibit 2003
Fractus v. Geotab
Page 559 of 563

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		 Nokia Schematics at 10 (showing electrical diagram of antennas and containing chart noting that the “GSM antenna” has three frequency bands):	

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)

Band	Channel	RX	VCO	VC
GSM 900	37	942.4MHz	3769.6MHz	~1.33V
GSM 1800	700	1842.8MHz	3685.6MHz	~0.98V
GSM 1900	661	1960MHz	3920MHz	~1.93V
WCDMA	10700	2140MHz	4280MHz	~3.30V

Nokia Breakdown at Timestamp = 12:12:



Nokia Manual at 9:

> The wireless device described in this guide is approved for use on the EGSM 900/1800/1900, and UMTS 2000 network. Contact your service provider for more information about networks.

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		Nokia Manual at 97: When you are using your phone in GSM and UMTS networks it is possible to have multiple data connections active at the same time; access points can share a data connection; and data connections remain active (for example, during voice calls). For information on how to see how many data connections are active, see Connection manager, p. '91'. See also network indicators in Essential indicators, p. '15'. The following indicators may appear below the signal indicator, depending on which network you are using:  - GSM network, packet data is available in the network.  - GSM network, packet data connection is active, data is being transferred.  - GSM network, multiple packet data connections are active.  - GSM network, packet data connection is on hold. (This can happen during a voice call, for example.)  - UMTS network, packet data is available in the network.  - UMTS network, packet data connection is active, data is being transferred.  - UMTS network, multiple packet data connections are active.  - UMTS network, packet data connection is on hold. To the extent that this reference does not expressly disclose this claim limitation, in light of Plaintiff's apparent claim construction and infringement positions with respect to the Accused Products, a POSA would have	

Fractus Exhibit 2003
Fractus v. Geotab

Claim No.	U.S. Patent No. 8,810,458 B2	Nokia 6630	Attorney Notes (to be deleted before service)
		understood it to implicitly disclose it or would have found the claim limitation obvious. Additionally, it would have been obvious to a person of ordinary skill in the art to modify this reference with any one or more of the references disclosed in Defendants' Invalidity Contentions based on knowledge of one of ordinary skill in the art and for the reasons articulated in Defendants' Invalidity Contentions Cover Pleading.	

Fractus Exhibit 2003
Fractus v. Geotab
Page 563 of 563